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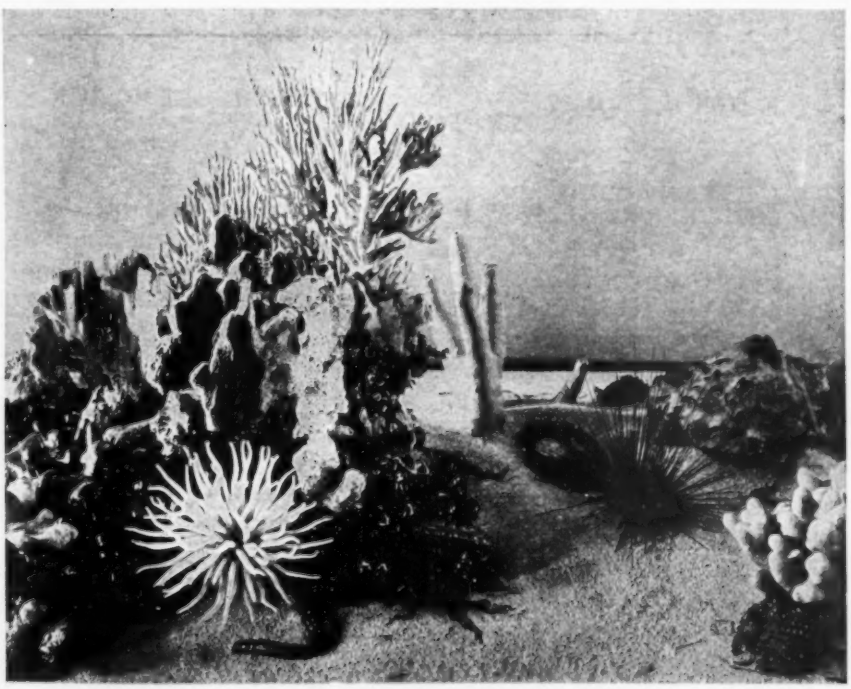
THE AMERICAN MUSEUM JOURNAL



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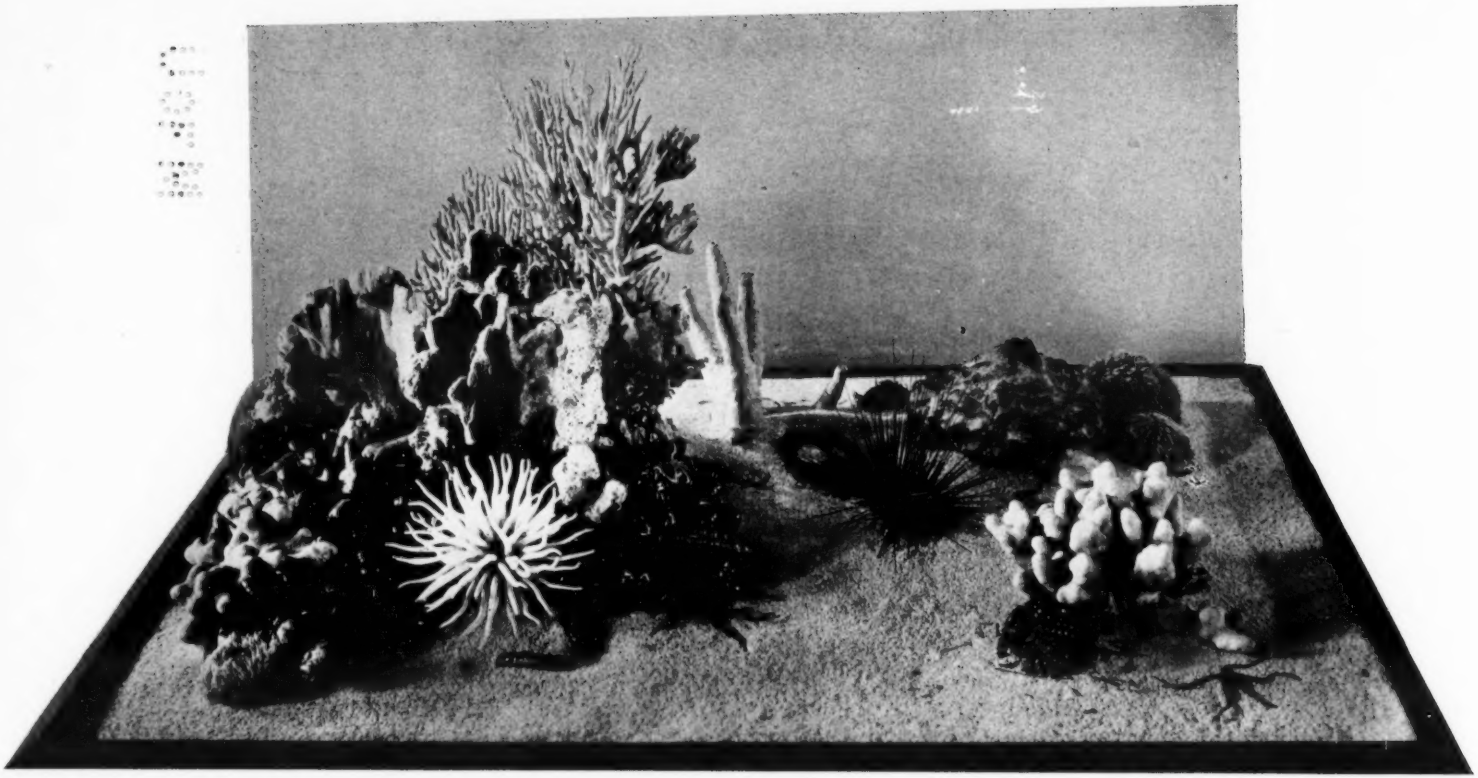


A NEW MARINE HABITAT GROUP.

An animal community such as may be seen below the edge of a coral reef in the Bahamas. (For description see p. 106.)

The American Museum Journal

VOL. IX MAY, 1909 No. 5

THE SERIES OF PROTOZOAN MODELS.

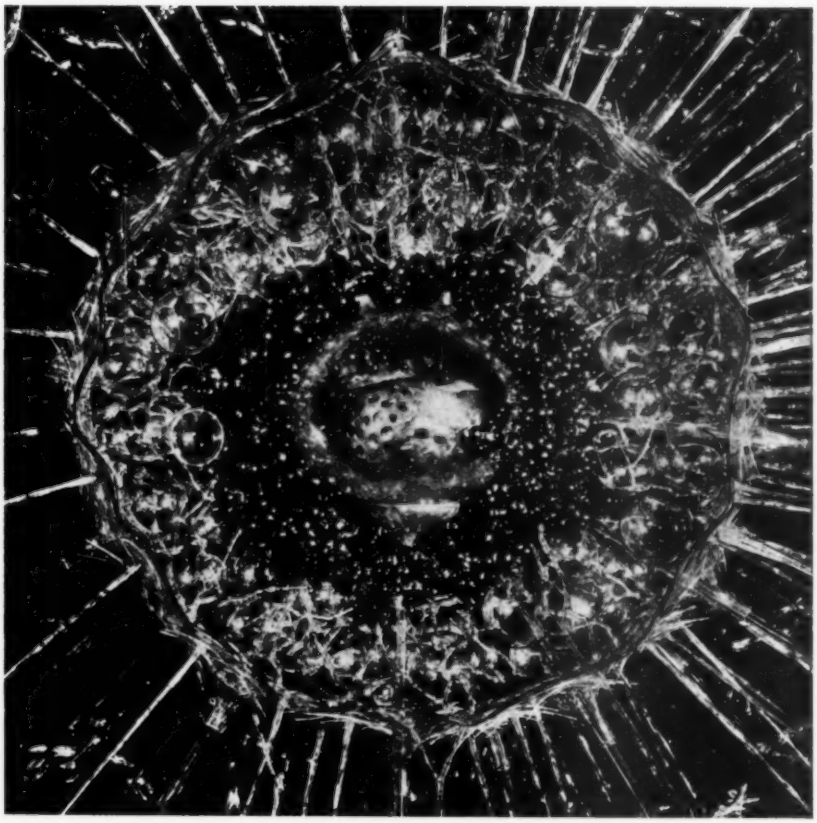
THE minute one-celled organisms known as Protozoa form a group of immense importance both from a biological and an economic standpoint. Swarming in countless millions in both fresh and salt water, and at times even in the bodies of other animals, they are the most abundant and most widely distributed of all life. Many of the smaller marine and fresh water creatures depend upon them for food, and among them may also be found some of the most important disease-causing parasites. The calcareous and siliceous skeletons of others settle to the sea bottom by thousands as the animals die, to collect in layers often many feet in thickness. The calcareous skeletons sometimes become compacted into solid rock, and thus are of great geological importance, many extensive cliffs of lime-stone and chalk having been formed in this way. The siliceous skeletons form the so-called "Radiolarian ooze," which is the source of the "Barbados earth" used in manufactures for polishing and grinding, and which forms no inconsiderable part of the island of Barbados. Though this vast world of creatures is so important and surrounds us on every side, penetrating, as it were, all the interspaces between the larger forms of life, yet it is invisible to our eyes, and were it not for the compound microscope, we should be absolutely ignorant of it, except in its effects.

The Museum is at present completing its series of greatly enlarged models of the typical Protozoa, and one of the most striking of these has recently been finished for exhibition. It is shown in the accompanying illustrations (pages 104 and 105). This Protozoan (*Auloceros elegans* Häckel) belongs to the group Radiolaria, so called because of the radiating siliceous or glassy skeleton which characterizes these forms. Sometimes these are of great complexity and beauty, and though the Protozoa as a whole are the simplest in structure of all animals, being composed of but a single cell, certain forms among the Radiolaria attain considerable complexity of intracellular structure, as may be seen in the figure.

In the middle of the animal is the oval nucleus, which is the essential center of its life activities, and which is itself extremely complex both in structure and in function. It is inclosed in a transparent double-walled "central capsule," in this species red in color, containing a portion of the living protoplasmic cell-substance (*endoplasm*) which is continuous with the surrounding outer protoplasm (*ectoplasm*) through openings at the summits of the three conical projections. The central capsule is partly imbedded in a mass of granular pigmented substance (the

THE PROTOZOAN, AULOCEROS ELEGANS HÄCKEL.

Glass model, greatly enlarged. Made by H. Müller under the direction of R. W. Miner.



MODEL OF AULOCEROS ELEGANS HÄCKEL.

View to show internal anatomy.

phæodium — dark green in this species), which surrounds and apparently issues from the upper opening of the capsule. It is probably of considerable physiological value to the organism and may be either associated with nutrition or a product of an excretory nature retained within the body for some secondary reason. The real explanation of its function, however, is still uncertain.

The true protoplasmic living-substance outside the capsule is distributed for the most part in the form of a network, which secretes and is imbedded in a jelly-like structureless matrix. This matrix is crowded with bubble-like, liquid-filled hollows (*alveoles*), which are so numerous that they reduce the animal substance to very narrow limits and give a foam-like appearance to this part of the structure. (In the glass

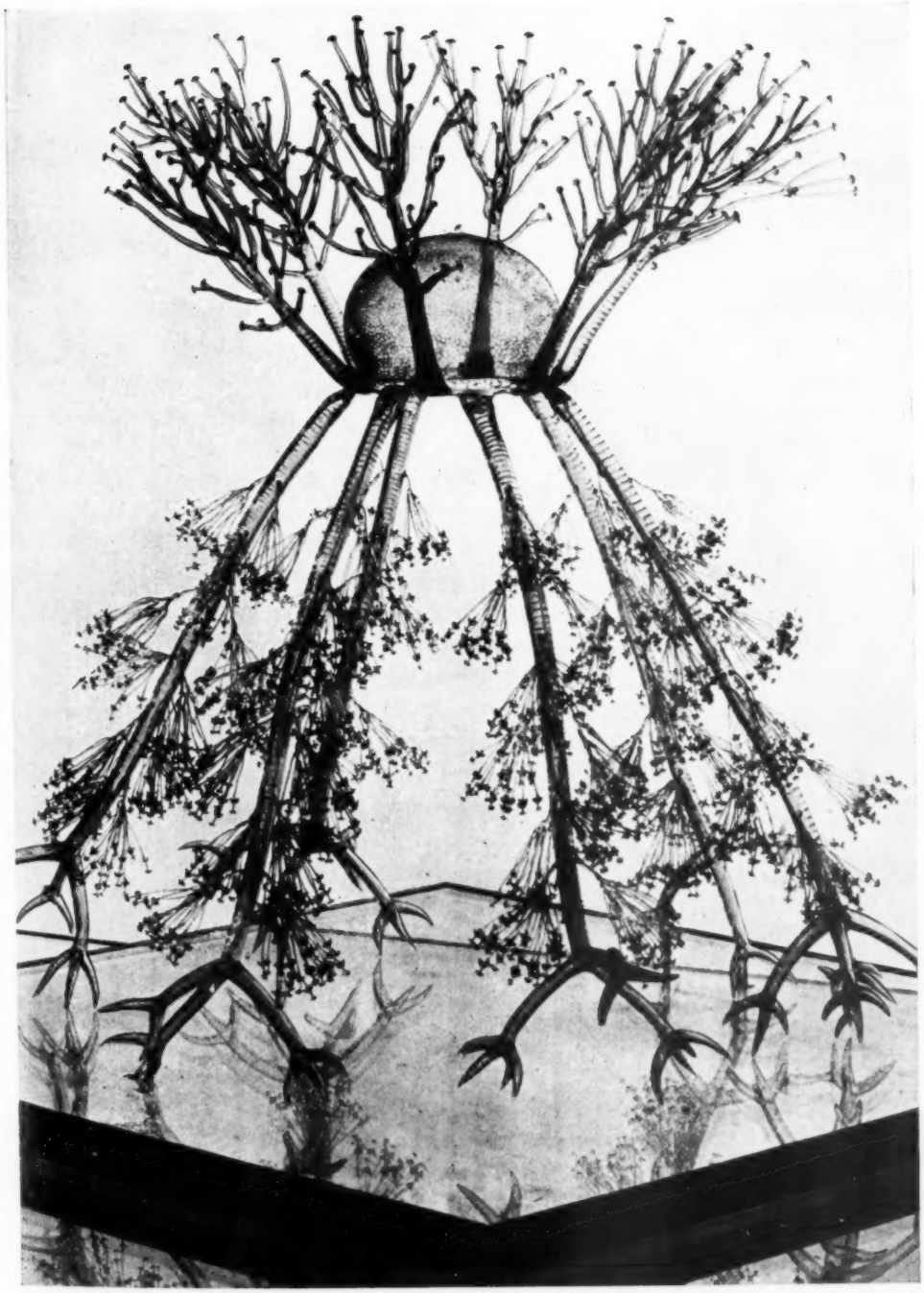
model each alveole is represented by a separately blown glass sphere.) Radiating outward from the central capsule may be seen the supporting glassy skeleton of the creature, each ray in this species separate, and branching antler-like at the tip. Particular notice should be taken of the delicate radiating filamentary projections of the animal body between the rays of the skeletal structure. These are the "pseudopods," prolongations of the living protoplasmic network which reach out in all directions and act somewhat as tentacles, seizing upon the minute animals which form the prey of the creature, and drawing them down within the body to be digested and absorbed. This ingestion may take place at any point of the surface, since there is no mouth and no definite stomach. The pseudopods are used also for locomotion.

In other related species all parts of the skeleton are welded rigidly together, often forming complicated and beautiful patterns, as in the genus *Gorgonetta*, the skeleton of which is represented by a model now on exhibition in the Museum (page 107).

ROY W. MINER.

A NEW MARINE HABITAT GROUP.

THE illustration on page 102 represents a group recently installed by the Department of Invertebrate Zoölogy. This group shows an animal community such as may often be found in the Bahamas not far below the exposed edge of a coral reef. It includes Brittle-stars, Sea Cucumbers, Cake-urchins and Sea-urchins, especially *Diadema setosum*, two fine specimens of which are represented bristling with long spines, like hedge-hogs. Coiled in and out through the crevices of the coral-rock is the brownish body of a *Synapta*, studded with knobs and displaying around its circular mouth-opening an expanded ring of plume-like tentacles. Conspicuous at one side of the group is the flower-like Pink-tipped Sea Anemone (*Condylactis gigantea* Weinland), which nestles at the base of a coral growth and is partly concealed by the brown slimy surface of an incrusting sponge. Above this rises the delicate fern-like colony of a Stinging Coral (*Millepora alcicornis*) together with a fragile, paper-like species (*Millepora plicata*), while other sponges and corals project here and there from the sand. The material for the group was collected in 1908 by Dr. B. E. Dahlgren and Mr. H. Müller off Andros Island in the Bahamas, and was for the most part prepared by the former in the Museum.



GLASS MODEL OF SKELETON OF PROTOZOAN, GORGONETTA MIRABILIS HÄCKEL.

Very greatly enlarged. Prepared by H. Müller.

THE GOBLIN SHARK.

MODEL OF THE GOBLIN SHARK.

A LIFE-SIZE model of a very rare and remarkable Shark from Japanese waters, a photograph of which is shown on this page, has recently been finished for exhibition in the Museum. The model well represents some of the animal's peculiar anatomical features, the most striking of which is the "rostrum," a paddle-shaped affair, richly supplied with blood-vessels and nerves, which projects forward from above the mouth and is probably used to feel about on the sea-bottom for prey. The long tapering body with extremely powerful tail indicates an adaptation for great speed. In life the shark is somewhat translucent and presents a peculiarly ghost-like appearance as it darts through the water. The alcoholic specimen from which the model was made is in the Museum collection and has been constituted the type of a new species (*Scapanorhynchus jordani*) recently described in the Museum "Bulletin" by Dr. L. Hussakof. The model was prepared by Mr. Dwight Franklin, under the direction of Mr. R. W. Miner, and is four feet five inches long.

DR. L. HUSSAKOF, Assistant Curator of Fossil Fishes, went to Europe in April to make a study of the icthyological collections of the leading museums. The last few weeks of his stay will be spent at the zoölogical station at Naples.

NEWS FROM THE MUSEUM'S ARCTIC EXPLORERS.

EARLY in April letters written the middle of October were received with news from the Museum's Arctic Alaska expedition. The letters come from Flaxman Island, situated in the Arctic Ocean off the northern coast of Alaska and about midway between Mackenzie Bay and Point Barrow, and record the union of Mr. Stefánsson and Dr. Anderson, who followed different routes after leaving Herschel Island in August.

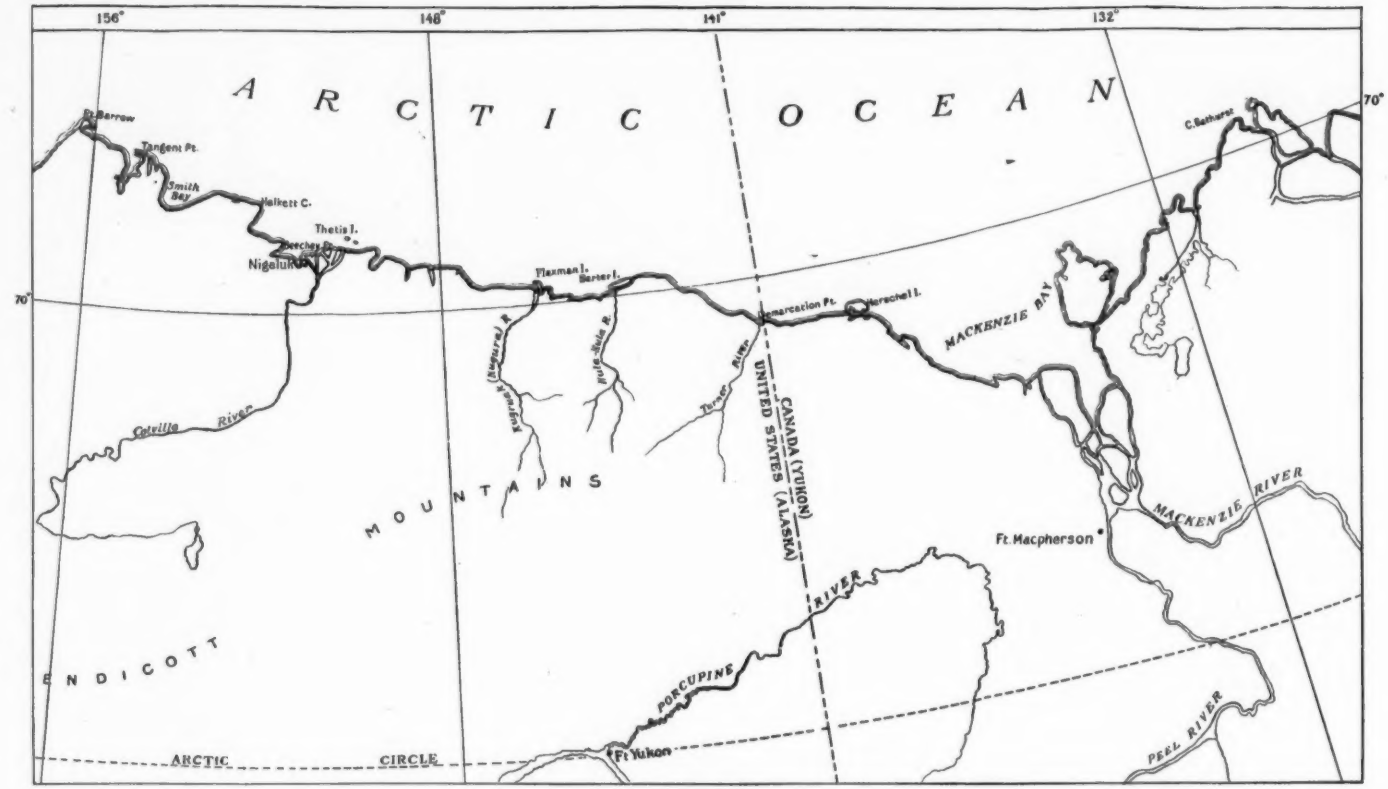
The route taken by Mr. Stefánsson was in part shown in the November, 1908, JOURNAL, and later facts were given in the March, 1909, number quoted from a letter written late last September. The expedition proceeded westward as far as Point Barrow; then on a return trip toward Flaxman was frozen in at Smith Bay, west of Cape Halkett, cached goods there, made a sled and continued slowly eastward. Dr. Anderson and his party cruised along the coast westward from Herschel Island until September 6, when their whaleboat was frozen in west of Barter Island and the men with their seventeen dogs had to proceed with sleds, feeding "on the country."

It is a satisfaction to know of the well-being of all members of this polar expedition up to October 19, 1908, when the Arctic winter was well started, and this feeling is intensified by a message that has come since the letters arrived. A telegram received by way of Seattle April 8, which was dispatched from Nome, Alaska, on April 6 and was originally dated at Point Barrow February 14, reads as follows: "Telegram of December fourth received. Well. Winter camp lower Colville. Game scarce. Nobody starving. Plans unchanged. Expect meet Whalers Baillie [Island]. Stefánsson."

Realistic accounts of the happenings of the weeks en route to Flaxman Island are given in the following quotations:

FLAXMAN ISLAND, ALASKA,
October 15, 1908.

*****We have made the trip from the delta of an unnamed river about 50 miles east from Point Barrow eastward to Flaxman Island, starting Friday, September 18, and arriving here Monday, October 12. Our trip was unusually slow for several reasons. I delayed some three days to visit



110 MAP OF ARCTIC ALASKA.

The Stefánsson-Anderson Expedition left Herschel Island in August in two parties pursuing different routes to meet at Flaxman Island in October. The winter camp has been on the lower Colville.

the Schooner "Olga" beset in the ice off Cape Halkett as a letter from there has already informed you;[1] we lost about five days at various rivers, either through waiting for them to freeze over or in taking stuff across their deltas in half-loads; we employed about five days in hunting, skinning and caching (on high wooden platforms) seal and deer. We got one seal and twelve deer. Of the deer, I saved five specimens for Dr. Anderson. Three of these were killed in the Colville delta, and two a little east of it — three fine bucks, one old female, one young female (female and young with horns in velvet). The deer show different stages of pelage — an old buck was in summer color still, while the doe was fully changed and the others ranged between. We also secured some specimens of mice, weasels and birds.

At Flaxman Island we found Dr. Anderson and the three natives, all well and Dr. Anderson reasonably satisfied with the fall months, though he had had a rather complete change from whitemen's diet and had been compelled at one time to eat up his mouse bait (5 lbs. of rolled oats). His party had lived on squirrels and seal oil for a time, and later, on deer, fish and grouse.

Off Point Tangent I put some of our supplies and some we were carrying for Leffingwell aboard the schooner "Rosie H.", whose captain, Fritz Wolki, promised to take Leffingwell's stuff to Flaxman and mine as far as he could go. He was frozen in here, so we have here the following stores: 27 sacks flour, 100 lbs. triscuit, 60 lbs. pilot bread, 80 lbs. bacon, 20 gallons coal oil, 4 tanks alcohol; this besides some of our ammunition, which we brought from the east.

These stores are, of course, by no means sufficient for our maintenance, nor are they, even if taken with our stuff in Smith Bay, where our boats were frozen in. We shall, therefore, leave here as soon as Dr. Anderson and I get our letters written — probably next Monday — and go looking for game. Dr. Anderson wants to try getting some specimens of sheep, so he with two natives will go to the mountains by way of the Kugruak (on maps "Kugura") River, while the rest of us go west to near Beechey Point. Here we already have 8 deer cached and hope to get more, while some of us will try to get seal outside the Thetis Islands, which are off shore just east of the Colville. If threatened with starvation, Dr. Anderson will come back to Flaxman and get the flour from the "Rosie H.", while if we fail to get game, we shall go westward to Smith Bay where our boats are. Just now we are getting some seal here at Flaxman — from one to three per day — but it is our opinion that these will not last, for the floe ice is very heavy off shore and all open places will soon freeze. Most of even those natives who habitually

[1] Published in this JOURNAL for March, 1909, p. 67.

live at Flaxman are going elsewhere for the winter. Our special anxiety is for the dogs, I now have eleven and our natives twelve more, inclusive of three pups. If the dogs should die, we should be severely handicapped for next year.

I should have liked to go to Herschel Island now and up to Ft. Macpherson (a two months' round trip) to meet the winter mail and reply to any letters you may send by it, but as Capt. Wolki will gladly carry our letters to Herschel and as this is the best season to accumulate a little game and fish (before the sun leaves us), I have decided not to pay attention to anything but the problem of making a living.

If we can subsist near the Colville, as we shall try to do, we shall incidentally see a good many of the Colville people probably; if things go exceedingly well, I may even be able to get far enough inland to see most of them. When the days get long I want to make a trip to Baillie Island [off Cape Bathurst] and with open water I expect to visit the Colville people when they gather for trade at the delta village of Nirglik [Nigaluk, on the map], while we shall also probably be able to do the much-desired digging on Pingok (the big island off Beechey Point). These are the hopes and plans for the spring.

It is the intention of Captain Wolki of the "Rosie H." to winter in Banks Land next year. He says he will take us and our gear down there and (weather permitting) will land us where he lands, or elsewhere if we desire. He will wait some time for some of his own incoming supplies at Baillie Island, and will take aboard there anything we have for transportation. We shall therefore gradually take our stuff to his ship this winter and either precede or follow him with our boats to Baillie Island — according to the season and circumstances. Then we shall go to Banks Land, or elsewhere, as seems best. From information secured by natives who were with Captain Mogg in Victoria Land last year, we now know there are people on Banks Land, though none have ever been seen there either by the early English explorers or by whalers coasting along the west shore.

A second letter written by Mr. Stefánsson two days later considers their need of ammunition and like supplies, and closes with the reassuring sentence: "You have, of course, no reason to worry about us; we are pretty well off."

Many interesting facts concerning the zoölogical work of the expedition are given in a letter from Dr. Anderson under date of October 14; while definite information as to plans for the immediate future are stated not only in the letter proper, but also in a postscript under date of October 19.

FLAXMAN ISLAND, ARCTIC OCEAN, ALASKA,
October 14, 1908.

* * * * * I started west with three natives in a whale-boat and a large skin canoe or umiak about 25 feet long, with the intention of cruising along the coast to Flaxman Island to meet Stefánsson early in September. We had seventeen dogs and ourselves to feed "on the country," as we started with about one sack of flour, four or five pounds of bacon, a little tea and coffee and about fifty pounds of dried fish. We had several gill nets and were obliged to stop and fish a good deal at various places. Fishing was only fairly good along the coast; we caught from ten to forty whitefish nearly every day and a few salmon trout, but could not get very many ahead.

We saw seven caribou and killed one August 18, at Demarcation Point, the international boundary. Our whaleboat was frozen in at a reef a little west of Barter Island, Alaska, on September 5, about fifteen days earlier than usually happens. We succeeded in drawing it up to an apparently safe place on the reef by means of block and tackle which we had with us, cached one chest of specimens and part of our goods with the boat and broke ice and dragged the skin boat over the sandbars to the mainland at the mouth of Okpilak River, taking part of our supplies with us.

We killed a good many squirrels here (*Spermophilus parryi*) which helped out our commissariat and made a few "skins" also. As we had only two or three days' provisions on hand, and as the ice was too thin for sled travel, we made pack saddles for several of our dogs, and started September 9 across the half-frozen tundra to the place where the Hula Hula River emerges from the mountains, and the swift water remains open much later than near the coast. The lower coast of both the Okpilak and Hula Hula froze over at the time the "young ice" formed in the sea lagoon. Snow fell on September 10 and has remained on the ground ever since.

At the fishing place on the Hula-Hula River we caught several hundred salmon trout (two species), many specimens being from six to eight pounds in weight. One day we caught 284. We also killed three caribou on September 14, but my native inconsiderately ripped the hides off and ruined them for specimens while I was chasing the fourth individual of the herd. We remained up-country over two weeks, returned to the coast for our two sleds, hauled the fish and meat back to our camp on the coast, and started as soon as possible for Flaxman Island, the sleds pretty heavily loaded with most of our fish and meat. We arrived at Flaxman Island October 4, after a rather hard trip along the coast, owing to rough frozen in blocks of ice in places and salt slush in others.

We had seen only one family of natives camped at Barter Island and two sailing in a whale boat late in August, and they had told us that Leffingwell

had left Flaxman Island and nobody was there now, as the natives were hunting in the mountains. Hence we did not know what we should have to do on arriving there, as it seemed probable that Stefánsson had been frozen in also. On arriving at Flaxman Island, we found the whaler "Rosie H." of San Francisco frozen in and wintering here. Captain Fritz Wolki reported that he had passed Stefánsson and Storkerson in Smith Bay with a sloop and a whaleboat * * * *.

Our flour, bacon and all "civilized foods" had been exhausted by August 30, the coffee very soon afterward, and from that time until we reached Flaxman, October 4, we were strictly on a meat and fish diet. We succeeded in pulling through without going hungry at any time, but a man misses the bread after a few weeks.

* * * * * In sending out part of our supplies from New York, I think it would be desirable and economical to send at least part of the lighter materials packed in substantial tin-lined chests which could be used for packing and transporting specimens in the North. The three collecting chests that I took out with me are filled with specimens (bird and mammal skins) and cached, one at Herschel Island and two near Barter Island, and I shall try to send the specimens out next summer. If I get no more chests, I shall have to send out these small skins in what wooden packing boxes I can find or patch together, and take chances of having them damaged by rats, mice or dampness in a long whaling voyage before reaching San Francisco.

* * * * * If the natives know that a man wants rare or unusual specimens, they often bring them in, and expect a present of some kind, or at least the ordinary fur trader's prices. For example, there is a species of badger found near the mountains a few miles from this coast, rather rarely, and what few the natives bring in are sold for about one dollar apiece. We may or may not be able to catch a specimen ourselves next spring. I have seen a native fur coat made of badger skins, and the fur is much denser and softer than the southern badger, which appears to reach its northern limit on the Athabasca River, around Pelican Rapids.

It is probable that we shall pass most of the winter and spring in the neighborhood of Smith Bay, near our "grub pile," spending part of the time a little farther east around the mouth of the Colville River.

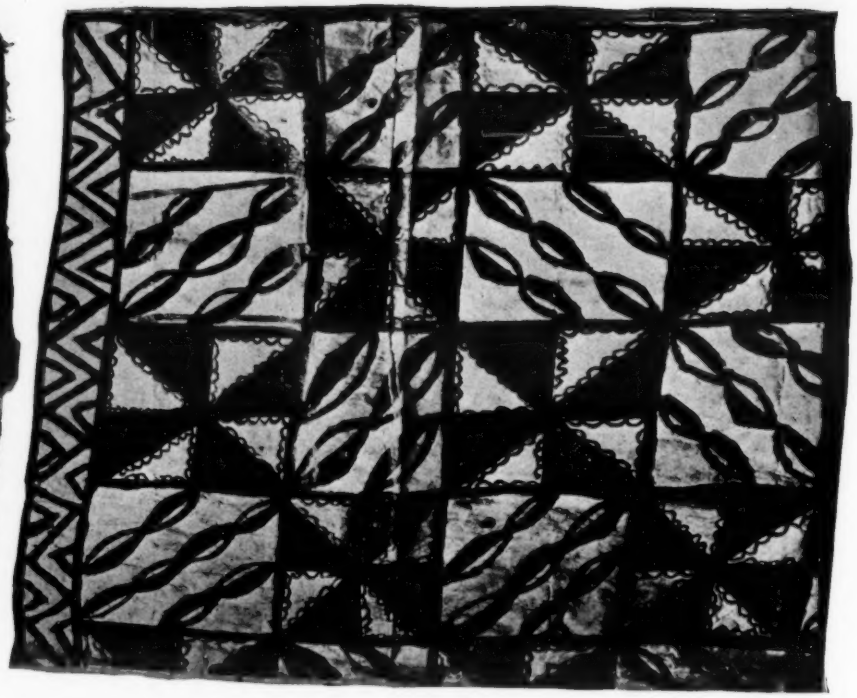
Stefánsson will probably start west very soon, while I go into the mountains near here with one of our natives, up either the Hula-Hula or Kugura River, and try to get some mountain sheep before the snow gets too deep. This part of the Endicott Range is said to be the best mountain sheep country left in Alaska, and the natives kill a good many at all seasons of the year. We met one native near Barter Island in August, who had just returned from the mountains, after killing twenty sheep. The caribou are

killed in considerable numbers all along this coast and are said to be working westward in greater numbers every year to the Colville River region and up towards Point Barrow. The natives say that the deer here are smaller than those east of the Mackenzie River. I have a very dark August specimen taken at Demarcation Point, on the Canadian side, Yukon Territory. I have a fair series of the two species of ptarmigan found here, all in the mottled transition plumage, a few small mammals, including a peculiar shrew from the Hula-Hula (at least different from any I have seen before). I made a good many bird skins along the coast in August and September.

Captain Wolki of the "Rosie H." is something of an ornithologist, and has collected bird skins and eggs in the Arctic Ocean for many years.*** He knows the species very well and is apparently a very close observer. He has a house on the Horton River, Franklin Bay, east of Baillie Island, where he lived and traded for four years. He says he has a collection of skins there now, including among others pomarine and long-tailed jaegers, golden eagle, hawks, and gulls. He has taken great numbers of eggs of the snow geese there, also whistling swan, American white-fronted goose, and black brant, in fact, nearly all the northern species except Ross's snow goose and yellow-billed loon. He says he saw one white pelican at the mouth of Mackenzie River and six spoonbill ducks taken at Horton River, both species being unknown to the natives. The Eskimo, by the way, distinguish between the different species better than most white men, and have names for nearly all the species.

October 19. Mr. Stefánsson left for the west to night with Billy Akpek and his wife and expects to spend some time deer-hunting around the Colville. I shall start east to-morrow with Ilavinerk and his wife in company with Capt. Wolki's outfit, bound for Herschel Island. We shall ascend the Hula-Hula River just west of Barter Island for a few weeks hunting for mountain sheep, together with any other specimens we can get in the mountains. We shall stay until we get a good series of specimens, or get starved out, then retreat to Flaxman Island and go westward from there.

PRESIDENT HENRY F. OSBORN will attend the Darwin Memorial celebration at Cambridge University, England, June 22–24, as the delegate of the American Philosophical Society. Director H. C. Bumpus will attend the same celebration as the delegate of the Museum and then will go to Geneva, Switzerland, to represent the New York Academy of Sciences at the 350th anniversary, July 7–10, of the founding of the university there.



116 STENCIL PATTERN. FIJIAN CLOTH.

The Fijians make " tapa ", their native cloth, from the inner bark of paper mulberry, rubbing with dye over a stencil to give it a pattern.

THE FIJIAN COLLECTION.

THE Museum has recently secured, as a gift from Mrs. Morris K. Jesup, a valuable collection from the South Seas. This accession, containing more than two thousand specimens, comes largely from the Fiji Islands and amply represents most features of the culture of the native inhabitants.

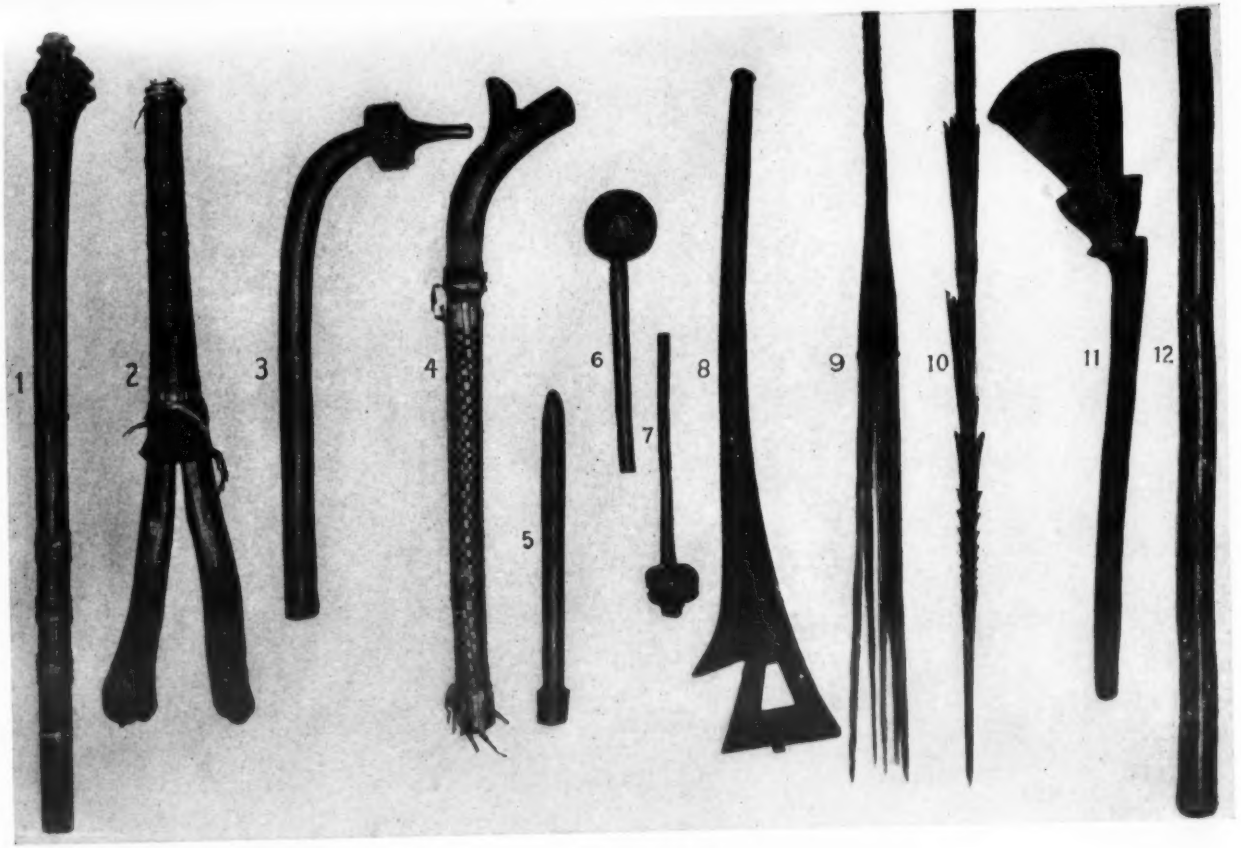
The Fijians, while resembling the Melanesians in physique, speak a language related to that of the Polynesians; also they share many cultural traits with the Polynesian inhabitants of Tonga and Samoa, with whom they have been in intimate contact for a long period. For instance, like their eastern neighbors, the Fijians drink kava, a stupefying beverage prepared from the roots of the plant *Piper methysticum;* and the new collection contains an imposing array of the bowls used in the process of kava making. Both preparation and drinking are accompanied by a great deal of ceremony. Young men, in public assembly, chew portions of the roots, then deposit them in the bowl, which is afterwards filled with water. Next a special official is entrusted with the task of straining the liquid, while hundreds of spectators watch his movements, imitate his postures and join in a choral chant. When the kava is ready for use, a prayer is recited by a herald, and the king, after pouring out a libation, drinks from a cup made from the half of a cocoanut. To be served after the sovereign is a great honor usually awarded for some distinguished personal service. A curious custom connected with the kava ceremony is the voicing of a toast after each draught. The drinker may express a wish for favorable winds, for plenty of fish or an abundant crop, or may set forth some other hope depending on his profession. Frequently, this ceremony is followed by a feast of yams, taro, figs and nuts.

One of the most notable achievements of the South Sea aborigines is the ornamentation of their tapa or native cloth, and here again the collection furnishes interesting evidence of both material and method. Tapa is manufactured from the inner bark of the paper mulberry, strips of which are beaten with a mallet and joined together with arrow-root paste to make the necessary size. Pattern-boards or stencils are constructed from large palm leaves, the designs consisting of coarse fibers or twigs sewed on to the leaf foundation. The cloth is placed over the stencil and rubbed with a dye until the pattern of the orna-

mentation is transferred. Fijian specimens, both of the finished product and of the stencils employed in its decoration, are shown in the illustration on page 116.

Other objects typical of the South Sea area generally, such as adzes, fly switches and tattooing implements are also adequately represented in the collection. There are numerous throwing-clubs, short sticks terminating in a knob, formerly carried in the girdle and used as the instrument of assassination. The collection contains a very large series of clubs of varying shape; some are obviously recent productions fashioned in imitation of guns. Many of these weapons have a carved decoration, which usually takes the form of a zigzag pattern of some kind. Part of them are wrapped with cordage, others with a checker plaiting. A weapon differentiating the Fijians from their eastern neighbors is the bow, which occurs in Polynesia merely in the form of a toy. A small assortment of Fiji earthenware (page 121) is of considerable interest, as all of the Polynesian tribes lack pottery and are obliged to prepare their food by baking or roasting.

One of the most valuable specimens is the model of a bure, or temple. This building was usually erected on a platform or mound, rendered accessible by a notched plank. From this eminence the bure rose to the height of about thirty feet. As nails were entirely unknown to the Fijians prior to European contact, they fastened together the posts and rafters by means of sinnet, the native cordage, prepared from the dried fibers of the cocoanut husk. In the construction of a temple, an immense quantity of sinnet was used for decorative purposes, so that from a distance the whole house seemed to be built of braided cord. Before lowering the corner posts into their holes, the Fijians offered human sacrifices to propitiate the deity of the temple; sometimes men were placed standing in each post hole and buried alive by the side of the post. The setting up of the first pair of rafters was solemnized with a cannibal feast, and a similar celebration took place as soon as the building was completed. The human bodies were baked in ovens. The forks or dishes used in eating human flesh were strictly "taboo," that is they were religiously reserved for this purpose under penalty of death. The Museum collection contains several of these cannibal forks and flesh-racks (page 121). Although serving as a council-chamber, a place for entertaining friendly visitors, and even as a sleeping-place for the most eminent residents of the village, the principal function of the



119

FIJIAN CLUBS AND SPEARS.

1 to 5, and 12 — Various types of clubs. 6–7 — Throwing clubs. 8 and 11 — Gun clubs. 9–10 — Spears.

MODEL OF BURE OR TEMPLE.

Nails being unknown, cordage was used to fasten together posts and rafters.

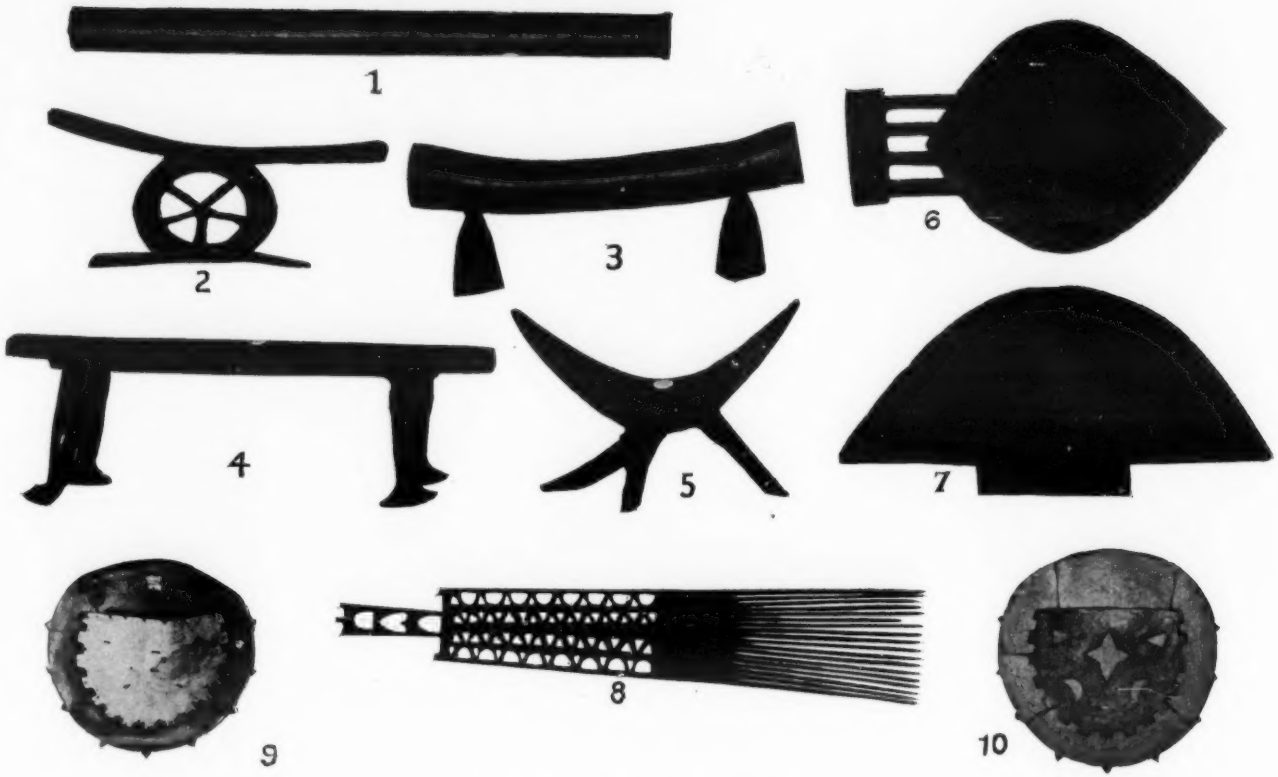
bure was for religious ceremonies. Here votive offerings of food and whale's teeth were presented to the deity. Here also the native priest fell into a trance, during which he held communion with supernatural powers, whose decision on the question at issue was afterwards announced to the populace.

While the temple illustrated the architectural skill of the Fijians, which is superior to that of all other Oceanians excepting the Maori of New Zealand, their craftsmanship in other directions is shown by the variety of their neck-rests and the attractive open-work decoration of their combs. (See plate on page 122.) Oil and food dishes of wood are of rather crude execution, but interesting in shape. Very artistic effects are produced in the breast-plates of shell bone, which are tastefully decorated with inlaid patterns.

The objects illustrated here and other material selected from the collection have been installed temporarily in a wall case in the northeast corner of the Siberian Hall (No. 101) on the ground floor.

ROBERT H. LOWIE.

CANNIBAL FLESH HANGERS (1 AND 3), CANNIBAL FORK (2), FIJIAN POTTERY (4 TO 6), KAVA BOWL AND CUPS (7 AND 8).



Nose flute (1), neck rests (2–5), wooden dishes (6–7), openwork comb (8), breast-plate, front and rear view (9–10).

DR. WILLIAM JONES.

IT is our sad duty to record the death of Dr. William Jones, a distinguished ethnologist who for several years was connected with this Museum, but who for some months had been on a collecting expedition for the Field Museum of Natural History, Chicago, among the less civilized tribes of the Philippine Islands. While near Monbato, Luzon, he was attacked by a party of savages on March 28, his thirty-sixth birthday, receiving wounds from which he died on the same day. This is truly a great loss to ethnology, since Dr. Jones was well equipped for work among the Algonkin Indian tribes of North America and had at the time of his death a wealth of unfinished work, most of which is now beyond recovery.

His college career began as a student at Harvard where he received the A. B. degree in 1900. Then he took up the study of anthropology at Columbia University, where he received the degree of Doctor of Philosophy in 1904. He was University Fellow 1900–1902 and Assistant in Anthropology 1902-1903. From 1904–1906 he was a Research Assistant for the Carnegie Institution. While at Columbia University, Dr. Jones made several expeditions for this Museum, returning with collections and data from the Ojibway, Sauk and Fox Indians. These collections are quite complete, those from the various divisions of the Ojibway containing a large series of birch bark charts and song records used in religious societies peculiar to these and related tribes. His chief work, however, was a study of the various Algonkin dialects spoken by the Ojibway, Fox and Kickapoo. Born of a mixed blood Sauk mother and reared by his maternal grandmother, he acquired one Algonkin dialect and gained an insight into Indian life not otherwise easily obtained. His published works include a volume of myths under the title, "Fox Texts," issued by the American Ethnological Society; a general discussion of Ojibway culture, published by the Department of Education, Toronto, Ont.; and "The Algonkin Manitou," in the *Journal of American Folk-Lore*. As these represented but a small part of the data collected by him, now buried in his notes, it is no adequate measure of his work. He had a knowledge and grasp of the ethnological problems centering around the central Algonkin tribes, all his own, and it was his intention after a short journey to the Philippines, again to take up the Algonkin problem as his life work.

Aside from scientific worth and attainments, Dr. Jones had a character and personality that endeared him to many in all walks of life. He was unassuming and modest, yet withal sincere and governed by a high sense of honor and duty. He had a rare sense of balance and proportion that enabled him to meet with sympathy every upright man on his own horizon. Perhaps this is why he had so many friends in such varied walks of life.

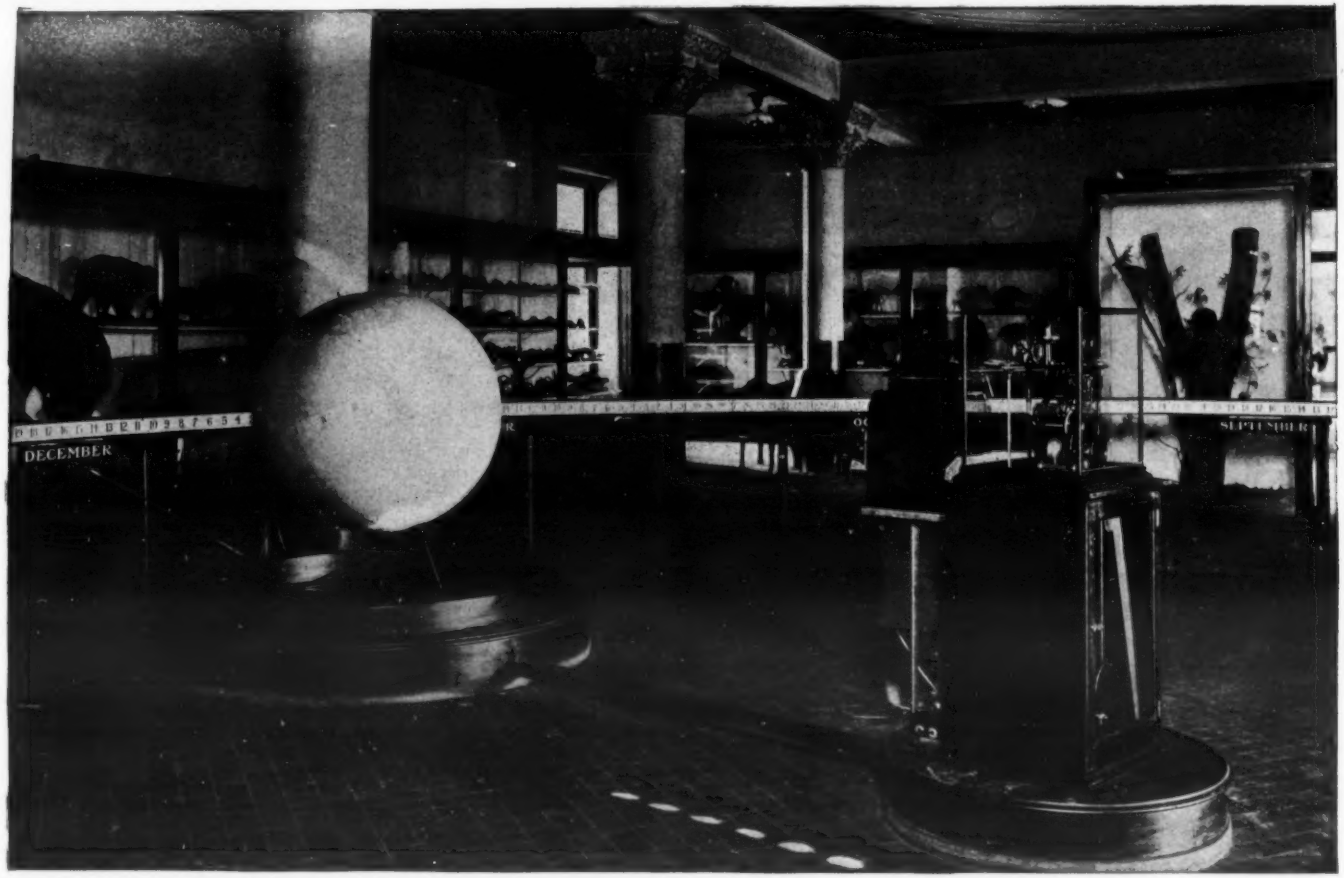
CLARK WISSLER.

THE EARTH AND THE SUN.

AN exhibit making clear the cause of day and night, of the differences of local time and of the succession of the seasons is shown in the accompanying photograph. A four-foot globe, standing for the earth, is regulated to rotate on its axis and to revolve in its orbit around the sun. The circular railing inclosing the exhibit and conspicuously marked with the months and days of the year indicates the orbit; a strong beam from an electric stereopticon represents the light and heat from the sun.

When the visitor approaches this exhibit, he sees no motion except the regular swinging of the pendulum of the clock-work that causes the globe's rotation. A short period of watching, however, convinces him that the globe is moving with the passage of the minutes to bring places most directly in the rays of the sun into the full light of noon time, regions west of these into morning hours, regions east toward the time for the "setting of the sun." The shadow of a line (in front of the lens of the stereopticon) is cast on the globe from pole to pole to mark the noon hour for the different localities, as one after another, from east to west, they reach and pass it; while the time for New York City is recorded continually, as the fifteen-minute sub-divisions on the equator of the globe approach and leave behind this same line shadow.

The location of the earth in its orbit at any day of the year and the inclination of the earth's axis are represented as they occur in the heavens. This exhibit differs from that of the Solar System in the Foyer in that little attention is given to proportional distances and dimensions. It is located, at present, in the Central Hall of the Second Floor, awaiting the construction of a Hall of Cosmology.



125 MODEL TO DEMONSTRATE THE CAUSE OF DAY AND NIGHT AND THE CHANGE OF SEASONS.

Central Hall, Second Floor. (No. 204.)

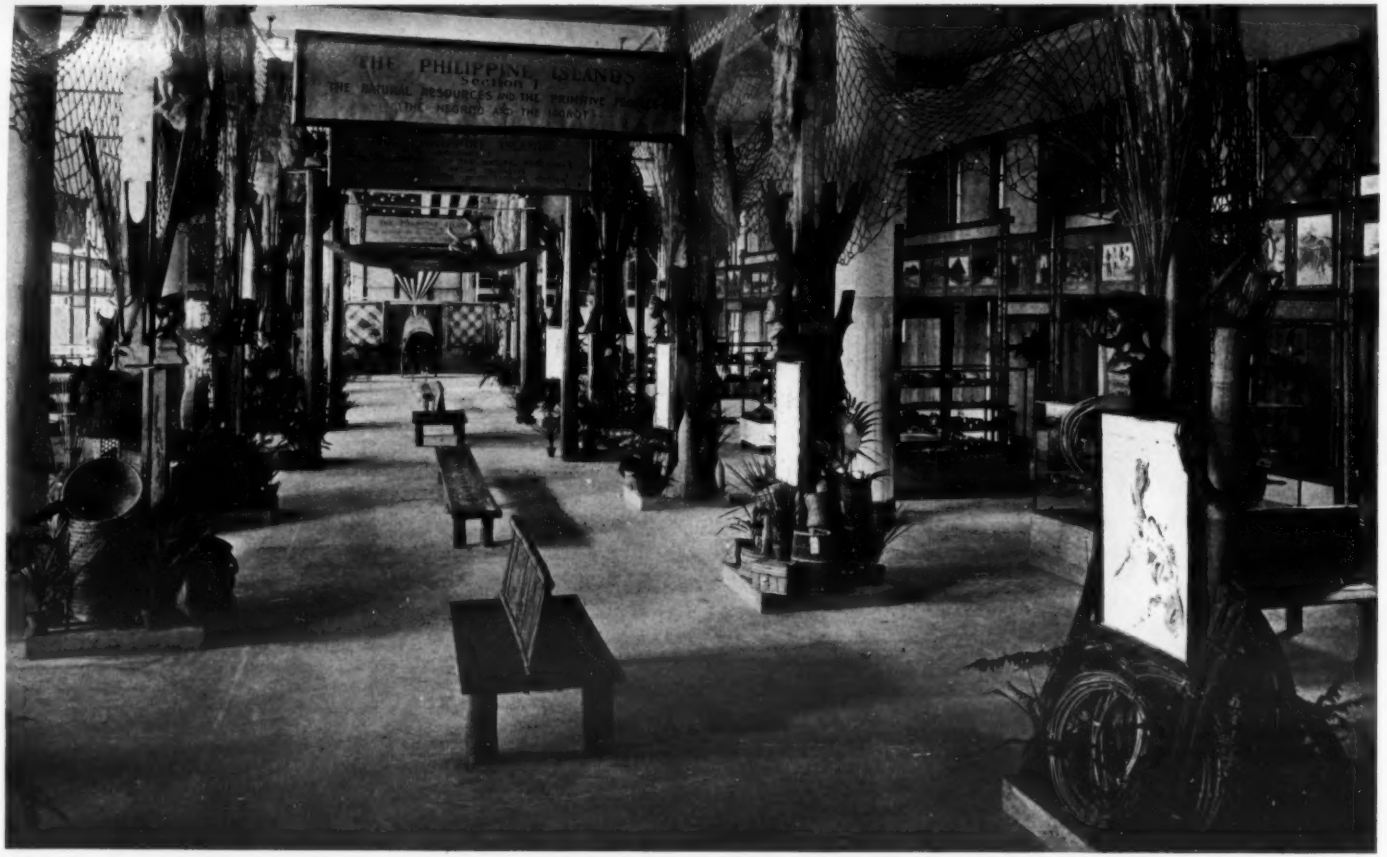
THE PHILIPPINE EXHIBITION.

THE Philippine Hall is dismantled and the Philippine Exhibit prepared at the request of the United States War Department, has disappeared from the Museum to reappear in Seattle on the opening day of the Alaska-Yukon-Pacific Exposition. There, given the same form that it had here, the same unity of idea, the same harmony of color and decorative effects, it will remain in the Philippine Building of the Exposition from June 1 until October 16, after which it will return to be given permanent installation in the Museum.

It is but little more than ten years ago that the Filipinos were in insurrection against Spanish rule. They had known nothing of freedom for nearly four hundred years, while this period of paternal government had civilized them and made them feel equipped for freedom. Not only had they no voice in the government, they had practically as little control over Philippine trade. Their tobacco industry was a State monopoly; their foreign commerce catered to Spanish interests and the merchants of Seville. As to education, there was but one teacher to every four thousand of population. The Filipinos had not even a medium of communication with Spanish authority, for the agents of the church in whose hands rested the management of schools, had kept the Spanish language out of the curriculum in order to retain their power as intermediaries between the people and the government.

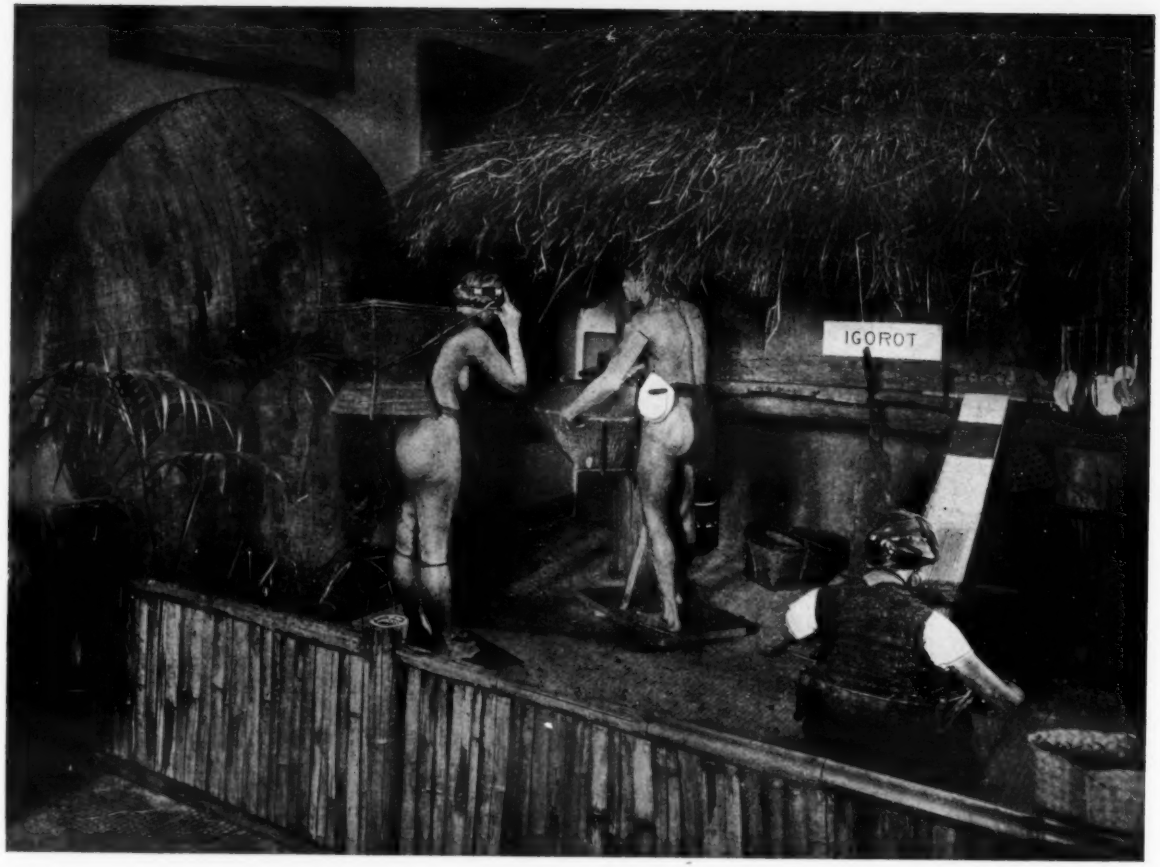
Then came American occupation in December, 1898; and, despite the best efforts of the American government, the story of the Filipinos in the years immediately following remained in many respects a sorry one. With lack of understanding of English, with no knowledge of America as a conquering nation, it was difficult indeed for even the most enlightened of the tribes to look upon the American military governor and the American army as friends instead of enemies. Guerilla warfare was added to the ravages of the previous war and continued until 1902. Rice fields were left to cogon grass and weeds; robber bands multiplied. In addition, typhoons damaged the hemp plantations; the locust plague destroyed crops; a "rinderpest" killed off the draft cattle; while cholera and various tropical diseases brought dread results to the Filipinos themselves.

Slowly out of the blackness of these years came trust in the American government and a radical change in conditions. Children and teachers



127 GENERAL VIEW OF THE PHILIPPINE EXHIBIT.

Set up at the Museum, then packed and shipped to the Alaska-Yukon-Pacific Exposition. Note series of transparencies surrounding the hall above the cases (showing at right in photograph).



IGOROT GROUP.

alike were glad to be taught English by the soldiers, who entered the schools at once and carried on the work until the arrival of one thousand teachers from the United States in 1900. The Filipinos also found themselves in possession of a share in the government, not only in the cities and provinces where two-thirds of the officials were elected by the people's vote, but also in the central government, three Filipinos and four Americans comprising the Philippine Commission. They gained practical ideas at the government experimental farms where they flocked in hundreds to see modern machinery and methods applied to the growing of Philippine crops. Each man learned that he could cut lumber free of charge from the public forests to build a substantial house and a boat. Many hundreds of Filipinos gained work and good wages in the construction of the new roads and railroads. Many an inland farmer found routes opened by which he could market his produce. The lepers and their friends realized that the homes provided at the Culion Island Leper Colony were better than any they had ever known. Prisoners from Manila appreciated the fact that they were made "colonists" on parole at Iwahig, with opportunity to work in the fields and earn the privilege of being joined by their families.

When these facts are borne in mind, the Philippine Exhibit assumes new interest. It shows not only what the Filipinos were, and what Philippine agriculture and commerce were, under Spanish rule, but also what they are under American influence. It proclaims emphatically that progress has been the keynote of life in the Philippines in these ten years, despite calamities, and it suggests that in the future the prosperity of the Philippine people is to be limited only by the great productive capacity of the islands.

The first section of the exhibit shows Negrito and Igorot huts with accompanying life-size figures represented in the work of making fire, carrying baskets of food, cleaning rice and weaving. The second section leads from these most primitive tribes through the Moro and other lesser tribes to the Tagalog and Visayan groups, the most highly civilized of the Malayan Christian Filipinos. The cases are filled with metal work, with pottery and basketry and with beautiful cloths woven from hemp, pineapple fibre and silk; the pillars carry weapons of many kinds, fishing and hunting outfits, busts of natives, and relief maps showing the localities occupied in the islands by each tribe.

Continually, however, the attention of the visitor is caught by the

colored transparencies that surround the entire hall in a bamboo trellis above the cases and some distance from the walls. The method here used of closely incorporating transparencies with the material part of an exhibit is an innovation in museum installation and a most effective one, not only for the accurate telling of facts but in general artistic result as well. In perhaps no other way could the Filipino people and their activities have been made so vivid; but the pictures do more than bring the people definitely before the eye, they give to a certain extent the atmosphere of the islands; they show the beauty of Philippine forests and rivers, the picturesqueness of the rice terraces that cover the mountain slopes, the difficulties of the mountain trails, and the sweep of typhoons over palms and sea.

There are many other decorative effects which also tend to give unity and meaning to the exhibition. Fish nets and hemp fibre connect the pillars to shut off a middle aisle, an open space except for seats constructed of Philippine woods and bamboo and of the stocks formerly in use in the market places of Manila. At the center of the hall a rotunda is made of large Philippine palm trunks around which are stacked Filipino guns, surrendered during that six months after President McKinley's reëlection in 1900 when more men gave up their guns in the islands than during any similar period in the history of war. Swung conspicuously in the center of this rotunda is one of the most charming features of the exhibit, a strange outrigger boat so typical of the small craft in the far east, containing a Moro youth, paddle in hand.

The third and fourth sections of the exhibit illustrate the Philippines under American influence, the former covering agricultural and commercial life, the latter, educational and political. Here it is that such significant facts as the following are concretely set forth:

> Philippine coal promises to be sufficient in the future for the needs of the islands.
>
> Philippine forests contain 665 kinds of trees and cover 48,112,920 acres. This fact is emphasized by a wainscoting of Philippine woods surrounding the entire exhibition hall, representing the largest and most authoritative collection in the world.
>
> There were 428 miles of standard gauge railroad in operation at the close of 1908, and four years more will give the islands a total of 1000 miles, whereas only about 120 miles of narrow gauge track existed at the close of Spanish rule.

Under the Americans 3506 primary schools have been opened, which number added to the 726 existing in Spanish times gives a total of 4,232 at present in the islands.

The cultivation of rice has latterly increased to such an extent that in 1907 there had to be brought into the islands from foreign countries only about one-third of the amount imported in 1903.

The Philippines are a commercial center for half the population of the globe. The total amount of produce sent out from the islands in 1907 was $33,097,867, and the total amount imported was $30,453,810, as compared respectively with $14,846,582 and $19,192,986 in 1899.

The most important fact developed in the Philippine Exhibit, outside of the increased prosperity of the islands, is that under American influence the Filipinos are eagerly taking the steps offered toward self-government and self support: that there is administration of justice in the islands and the people are engaged in peaceful pursuits, that the United States is not expending any money to assist the Philippine government or the Filipinos except in so far as the appropriations for Army and Navy are in part expended in the islands.

One other fact, however, is certain to stand out clearly before every thinking visitor to the Philippine Building at Seattle, which is, that the American record in the Philippines is one of which the world will be proud, when this record takes its place in the history of nations.

MUSEUM NEWS NOTES.

SINCE the last issue of the JOURNAL the following persons have been elected members of the Museum: Life Members, MESSRS. FREDERICK T. VAN BEUREN, KARL HUTTER, NATHANIEL T. KIDDER, CHARLES B. PENROSE and GEORGE D. PRATT; MMES. OLIVER G. JENNINGS, JOHN INNES KANE and SAMUEL LAWRENCE, and MISSES P. C. SWORDS and ANNE THOMSON; Annual Members, MESSRS. J. R. BRADLEY, CHAS. W. BURROUGHS, LOUIS C. CLARK, WM. CRAWFORD, ROBT. H. ENGLE, HENRY P. FAIRBANKS, GEORGE R. FEARING, HARRY L. FERGUSON, ARNOLD HAGUE, H. H. HOLLISTER, MARC KLAW, ALFRED G. MAYER, HENRY METCALFE, CASIMIR DE R. MOORE, WILLIAM E. NICHOLS, GEORGE E. POLLOCK, THOMAS R. PROCTOR, H. CASIMIR DE RHAM, A. W. ROSSITER, THOS. ROWLAND, CHARLES W. SABIN, HENRY

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PRESIDENT OSBORN has recently been elected one of the twenty-five foreign members of the Zoölogical Society of London and an Honorary Member of the Royal Academy of Sweden.

PROFESSOR H. E. CRAMPTON, Curator of Invertebrate Zoölogy leaves New York early in May for an absence of eight months on an expedition to the South Seas for the purpose of continuing his important studies on the variation and distribution of terrestrial snails, a work which he began in 1906 for this Museum and continued in 1907 and 1908 under a grant from the Carnegie Institution. Professor Crampton will devote most of his time to the Society Islands, the Cook Islands, the North Island of New Zealand, Samoa and Hawaii.

A RECENT letter from Mr. William B. Richardson, collecting for the Museum in Nicaragua, announces the shipment of a large collection of birds and mammals made during the last six months at points ranging in altitudes from 700 to 5,000 feet. Among the mammals are many species not included in his previous shipments.

DR. ALEXANDER PETRUNKEVITCH, Honorary Curator of Arachnida, will spend July and August collecting arachnida and other forms of insect life in Texas, Mexico and Guatemala.

PUBLIC meetings of the New York Academy of Sciences and its Affiliated Societies will be held at the Museum as usual during May.

The American Museum Journal

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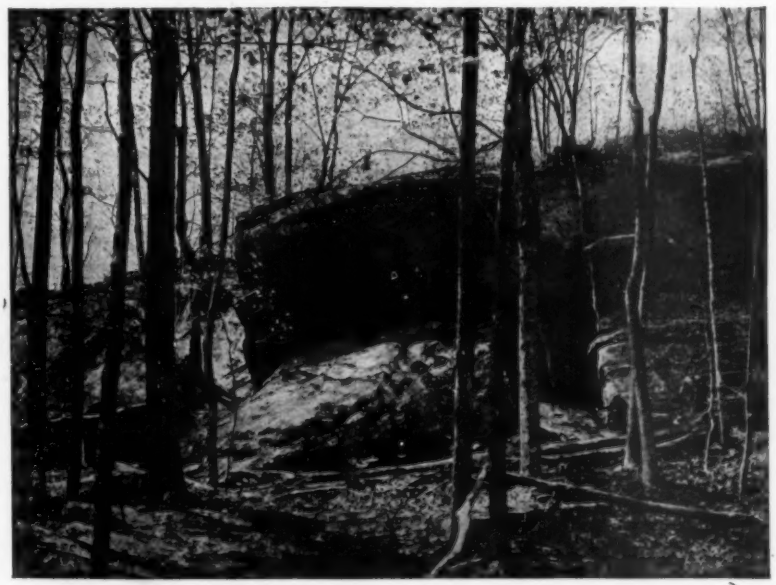
The Indians of Manhattan Island and Vicinity



AN INDIAN ROCK HOUSE IN GREATER NEW YORK

By ALANSON SKINNER

Department of Anthropology

GUIDE LEAFLET NO. 29

SEPTEMBER, 1909

American Museum of Natural History

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The membership fees are,

Annual Members	$ 10	Fellows	$ 500
Life Members	100	Patrons	1000

All money received from membership fees is used for increasing the collections and for developing the educational work of the Museum.

The Museum is open free to the public on every day in the year.

* Deceased.

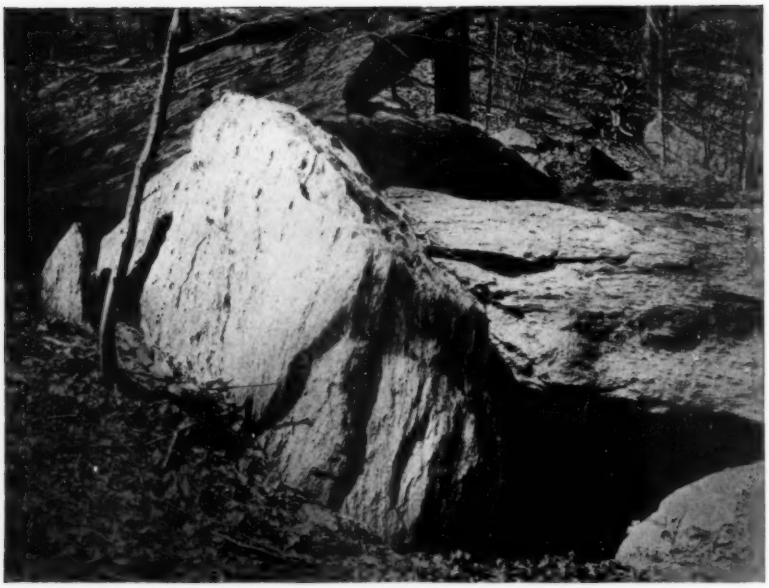


FIG. 1. INWOOD ROCK-SHELTER, MANHATTAN.

FIG. 2. FINCH'S ROCK HOUSE.

The Indians of Manhattan Island and Vicinity

By ALANSON SKINNER

Department of Anthropology

A GUIDE TO THE

HUDSON-FULTON EXHIBIT

AT THE

American Museum of Natural History

NO. 29

OF THE

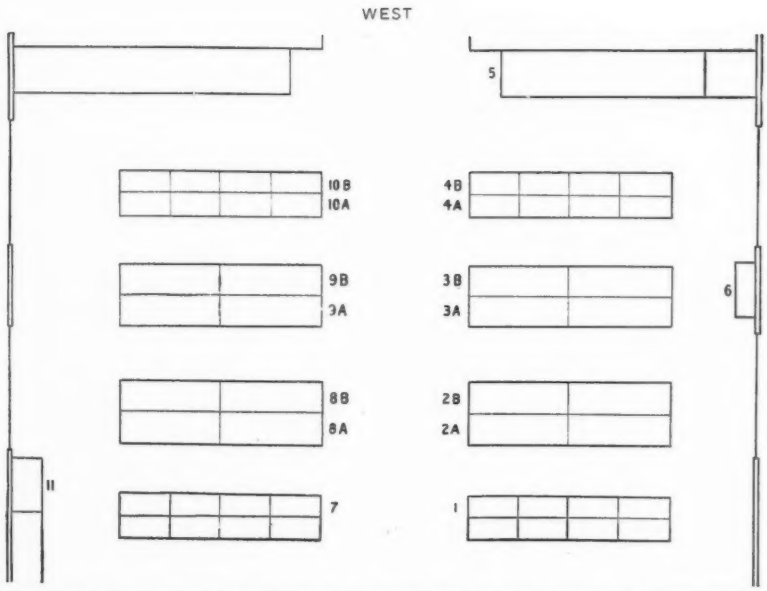
GUIDE LEAFLET SERIES

OF THE

AMERICAN MUSEUM OF NATURAL HISTORY

EDMUND OTIS HOVEY, EDITOR

New York. Published by the Museum. September, 1909



FLOOR PLAN, WESTERN END OF THE HALL OF THE PLAINS INDIANS (No. 102).

EXPLANATION OF CASE NUMBERS.

1 Mohegan and Delaware. Iroquois: Clothing; Weapons.
2A Prehistoric Life in Greater New York.
2B Prehistoric Manhattan Island.
3A Shinnecock Hills, Long Island.
3B Van Cortlandt Park. Long Island.
4A Iroquois: Corn Food; Household Utensils.
4B Iroquois: Transportation; Games; Ceremonial Objects; Wampum.
5 Iroquois Group.
6 Shell Heap.
7 Iroquois: False Face Society.
8A Westchester County.
8B Upper Hudson.
9A Kah Kwah and Erie Indians of New York State.
9B New York State. Articles of European Manufacture.
10A Pottery of Greater New York. Husk Face Society.
10B Bolton and Calver Collection.
11 Rock Shelter.

THE INDIANS OF MANHATTAN ISLAND AND VICINITY.

By Alanson Skinner,
Department of Anthropology.

Introduction.

As a part of the Hudson-Fulton celebration, a special exhibit representing the Indians of New York has been arranged in the West Hall, on the ground floor of the Museum. The low, or table cases, contain implements of stone, bone, shell and other materials, found on Manhattan Island and in and around Greater New York,— implements once used by the Indians occupying this region. In the upright cases will be found ethnological objects, many of which are still in use among the surviving Iroquois Indians of New York State. This guide, therefore, refers chiefly to the remains of Indians found upon Manhattan Island and adjacent shores, examples of which are shown in the table cases. The location of the various cases may be seen from the accompanying plan.

In using this guide, the visitor is advised to turn north, as he enters the exhibit and take a general view of the cases in the order designated; then it is suggested that he follow the discussion (pp. 14–36) of the various kinds of specimens found near New York City as he makes a second examination of the exhibits in the table cases.

The Hudson-Fulton exhibition is designed to show the life of the Indians of New York City and vicinity in prehistoric times, when primitive conditions were as yet unchanged by the advent of European settlers. The objects shown have been collected by Museum expeditions sent for the purpose of excavating the ancient village, camp and burial sites of the Indians in several localities within the area indicated, and the exhibits have been prepared from the remains thus secured. The remnants of the tribes that once occupied the primeval forests of Greater New York have so long been scattered and lost that almost nothing can be obtained from them now.

Beginning with the northern half of the exhibit, the visitor will find the first section of the upright case (1)[1] devoted to a few specimens showing some of the more perishable articles formerly in use among the Delaware and Mohegan Indians of this immediate vicinity. Most of these have been collected from the scattered remnants of these people, or else were obtained from old families who, since the disappearance of the natives, preserved

[1] See diagram on page 4.

articles of Indian manufacture in their homes as curiosities. The other portions of this case exhibit the clothing and weapons of the Iroquois.

The first table section (2A) is devoted to an exhibition, as comprehensive as possible, showing the life of the natives in prehistoric times by means of specimens obtained from the ancient village and camp sites. Here may be seen bones of the various animals, fish and shell-fish upon which the Indians depended for subsistence; fragments of nuts, corn, roots and other food products preserved by charring and obtained from ancient fireplaces, and such implements as arrow points of antler and stone, net-sinkers of stone and stone hoes for tilling the fields — all illustrative of primitive methods of hunting and agriculture. Implements exhibited in the same case show the preparation of animal and vegetable food with primitive utensils, while close by are tools used by the Indians in preparing skins. The manufactures of the Indians are illustrated in the immediately adjacent section (2B). A progressive series of implements shows the making of an arrow point from a simple quartz pebble such as might be picked up anywhere on the shore, with the various stages leading to the finished point; the tools employed are also exhibited. Implements of stone for pecking, grooving and polishing; hatchets and axes; pottery fragments, and household utensils, such as hammers, axes, adzes and gouges, will be found at hand.

In the other side of this table case (2B) there is an exhibit from Manhattan Island, made up of specimens principally collected by Mr. Alexander C. Chenoweth in the rock-shelters and village sites at Inwood, showing as fully as possible the life of the prehistoric Manhattan Indians. The exhibit illustrating, by means of models, the manufacture of pottery is especially noteworthy. From the appearance of fragments now to be found on the sites of the ancient Indian villages of this vicinity and the methods of modern Indian pottery makers, we may safely conclude that most, if not all, of the earthenware manufactured in this locality was made by the "coil" process, which consisted of the following steps. The Indians first secured clay of a suitable quality, which was mixed with pounded shell or stones to make it tougher and more durable. It was then worked into long rolls, and the Indian, beginning at the bottom, worked the pot up by adding coil after coil, blending or smoothing the coils with a smooth stone until they did not show from either the interior or exterior surface. The potter's wheel was not known to the aborigines in the olden days. When the pot was completed, it was decorated by stamping or incising designs about the exterior of the rim.

In the next table case (3A) are to be seen implements and remains from the shell heaps marking the long-forgotten Indian villages at Shinnecock Hills, Long Island. This exhibit, which is one of the most complete of its kind, gives a rather adequate picture of the ancient life of these people

and is especially valuable for the number and variety of primitive manufactures shown. One of the most interesting of the sections demonstrates, by means of a series of specimens, the primitive methods of cutting bone and antler employed by these Indians. Bone was cut by notching or grooving it with a stone knife or flake and then breaking it at the groove. Antler was worked in the same way, but it is very probable that the Indians boiled antler in order to make it more pliable and easily cut.

In the western side of this case (3B) there is a series of specimens collected from an ancient Indian village situated on the site of the Parade Ground at Van Cortlandt Park. In the adjacent section some specimens from Long Island in general are shown.

The upright case (4A) at the end contains an exhibit from the Iroquois Indians of New York State, and the small wall case (6) on the side shows a section of a shell heap with a map showing the location of most of the

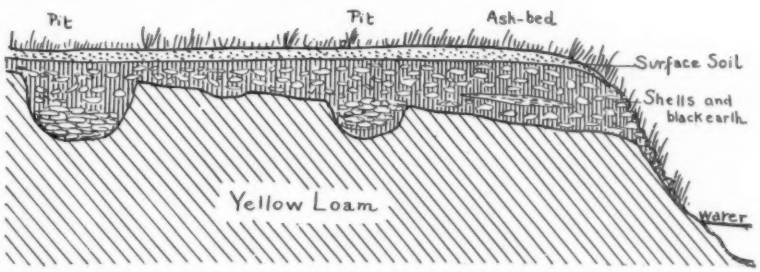


FIG. 3. DIAGRAM OF A TYPICAL SHELL DEPOSIT.

Indian villages of Greater New York and vicinity, as well as photographs and labels describing the opening and excavation of the sites. Specimens typical of those found in the shell heaps are also exhibited.

Of all the traces left by the aborigines along the New York seacoast, the most abundant and familiar are the shell heaps -- the beds of refuse marking the sites of ancient villages, camps and isolated wigwams. Wherever the fresh water joins the salt and especially where open water for fishing, a creek with its clam beds and a spring for drinking come together in happy combination, there is generally to be found some such evidence of Indian occupation, unless, as is often the case, settlement and improvement have buried deep the shells or carted them away.

The typical "shell heap" is not a heap at all, for leaf mold, the wash from neighboring high ground and often cultivation have made it level with its surroundings (Fig. 3). Very often, unless the land be plowed, no shells whatever show on the surface, and the only way of finding out the conditions

of things below the sod is to test with a spade or a crowbar. If shells are present, their crunching soon gives notice of the fact. Sometimes shell heaps have been located by shells thrown from mole and woodchuck burrows, or by outcropping in gullies washed by the rain, or banks broken down by the surf. They are generally located near some creek or bay on low but dry ground, preferably with an eastern or southern exposure, and, as before mentioned, not far from drinking water. Some have been found fronting on the open Sound, but such cases are rare. These deposits consist of large quantities of decayed oyster, clam and other marine shells mixed with stained earth, with here and there ashes, charcoal and fire-broken stones to mark the spots where ancient camp fires blazed. Among

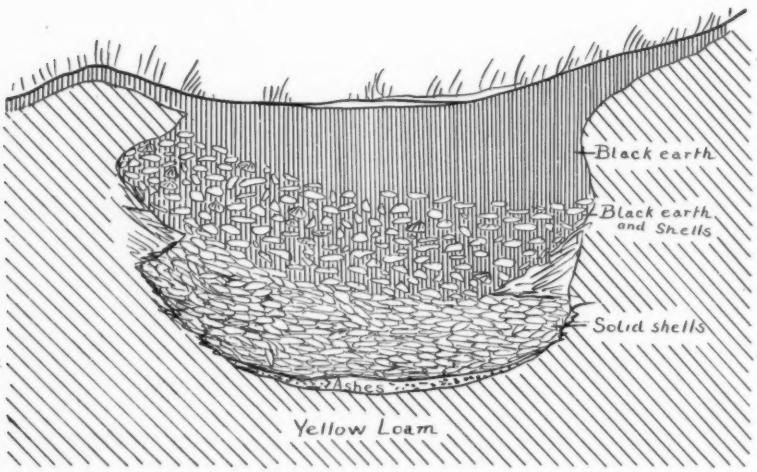


FIG. 4. CROSS SECTION OF A SHELL PIT.

the shells are usually scattered antlers of deer, fish bones, bones of animals and birds split for the marrow, quantities of pottery fragments, and broken implements, in short, the imperishable part of the camp refuse left by the Indians. Now and then, perfect implements and ornaments that had been carelessly lost in the rubbish or hidden for safe-keeping are discovered. Little did the Indian think, as he laid away his little hoard, that his handiwork would never see light again until he and his people had long been gone and forgotten.

Shell heaps vary from a few inches to four feet in depth, and in area from a few square yards to several acres — all depending on the length of time the settlement was occupied and the number of dwellings comprising it. Deep shell heaps are often divided into layers, the lowest of which are, of

course, the oldest. Under and near most of these deposits may be found scattered "pits" or fire holes, which are bowl-shaped depressions in the ground filled with layers of stained earth, shells and other refuse, with an occasional layer of ashes. Some pits are as large as ten feet wide by six feet deep, but the average is four feet deep by three feet wide. It is supposed that they were used as ovens or steaming holes and afterwards filled up with refuse (Fig. 4). Some contain human skeletons, which may have been interred in them during the winter season when grave digging was impossi-

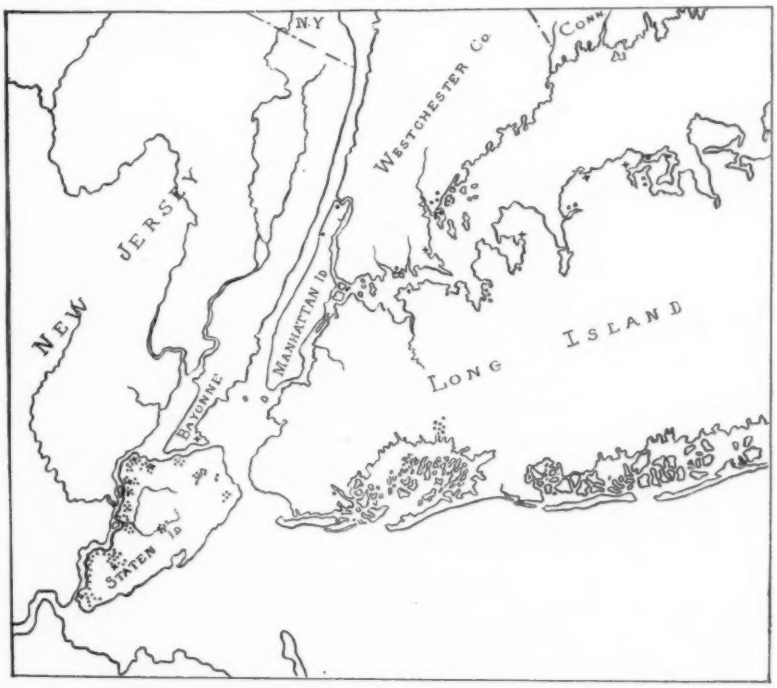


FIG. 5. MAP GIVING THE LOCATIONS OF SHELL DEPOSITS.
Those marked + have been explored by the Museum.

ble. Pits as a rule, contain more of interest than the ordinary shell layer. The closely packed regular masses of shells form a covering which tends to preserve bone implements, charred corn and such perishable articles from decay in a way that the looser shells of the general layers fail to do.

Shell heaps, while abundant along the seacoast, are seldom found inland, except on salt creeks or other streams having access to salt water. They may be seen all along the east shore of the Hudson River at more or less

frequent intervals up as far as Peekskill, and on Croton Point and between Nyack and Hook Mountain on the west shore they attain considerable size. There are a few small deposits, however, composed mainly of brook clams (Unio) situated on fresh water lakes in the interior of Westchester County. There are many shell heaps on Staten Island. Shell heaps occur or did occur on Constable Hook, New Jersey, and at intervals between there and Jersey City along the western shore of New York Bay. The accompanying map (Fig. 5) gives the location of the important known shell deposits of the vicinity of New York City.

FIG. 6. GRAVE OF SKELETONS WITH ARROW POINTS.

On the opposite side (4B) of the upright case, the Iroquois exhibition is continued, but the last section is devoted to a small exhibit showing the manufacture of wampum by the Indians of Long Island with prehistoric implements and a number of specimens of wampum belts and strings collected from the Iroquois of New York and Canada.

The wall case (5) at the western end of the room contains a group illustrating the costumes of the Iroquois Indians of a period from about 1790 to the present day.

Beginning on the south side of the aisle, the easternmost upright case

(7) is devoted to the False Face Society of the Iroquois, while the table case (8A) immediately following contains objects from Westchester County and Staten Island. In these sections an interesting feature of aboriginal life is shown. Although most of the Indians of the vicinity of Greater New York did not place objects in the graves with their dead, some graves at Burial Ridge, Tottenville, Staten Island, when opened for the Museum in 1895, were found to contain a great many interesting and valuable remains. With the skeleton of a child there was a great deposit of utensils, both finished and unfinished ornaments, such as beads, pendants, and the like, a stone pipe and a number of other objects, while not far away the skeletons of three Indian warriors were exhumed (Fig. 6), in and among whose bones there were found, as shown in this section, twenty-three arrow points of stone, antler and bone (Fig. 7).

This is an excellent exhibit indicating the use of the bow in Indian warfare. The skeletons lay side by side with the legs flexed as shown in the illustration (Fig. 6). In the first skeleton, it was found that two points of antler and one of bone had pierced the body and lodged near the spinal column. Another point of argillite had been driven between two ribs, forming a notch in each. A bone arrow point had struck the shoulder and was resting against the scapula. Among the bones of the right hand, an arrow point of antler was discovered, and there was a similar one near the left hand. Another antler point was lying in the sand just beneath the body and had, no doubt, dropped from it when the flesh wasted away. The most interesting wound of all was one where an antler-tipped arrow had ploughed through one side of the body and fully one-third of the point had passed through one of the ribs, making a hole, where it remained, as smoothly as if drilled. The second body was also terribly injured. The left femur showed an elongated puncture near the lower end, probably made by an arrow point. Among the ribs was the tip of an antler point, and a yellow jasper one was among the ribs on the left side of the body. Three other points were among the bones. The third skeleton was likewise an example of old-time bow play. There was an antler point among the ribs on the left side. The end of one of the fibulæ was shattered by a stone arrow point, and a second point had lodged between two ribs. Beneath the sternum was a flint point, and the right shoulder blade showed a fracture near the end, caused by a blow of some hand implement or an arrow. Near the base of the skull, the end of an antler arrow point was discovered, broken perhaps by its impact with the occiput. Two bone points were near the lower bones of the left leg. A second point was found upon search among the left ribs; under the vertebræ was the base of another antler point, and two broken points were found beneath the body.

FIG. 7. BONES PUNCTURED BY ARROW POINTS, FROM SKELETONS FOUND ON STATEN ISLAND.

The position in which several of the points were found certainly speaks well for the great force which propelled them. The long bows of the local Indians must indeed have been formidable weapons. Taking into consideration the number of arrows which must have been imbedded in the bodies of the warriors, it is perhaps probable that the majority of the projectiles were driven into the victims at close range after death.

In the wall case (11) south of the exhibit will be found the model of a rock-shelter and typical objects found in such places. These, as the name implies, are protected spots in rocky ledges, where Indians once made more or less permanent places of abode. Many such shelters exist in the vicinity of New York, one or two having been discovered at Inwood, Manhattan (Fig. 1). The most important rock-shelter so far discovered is the so-called

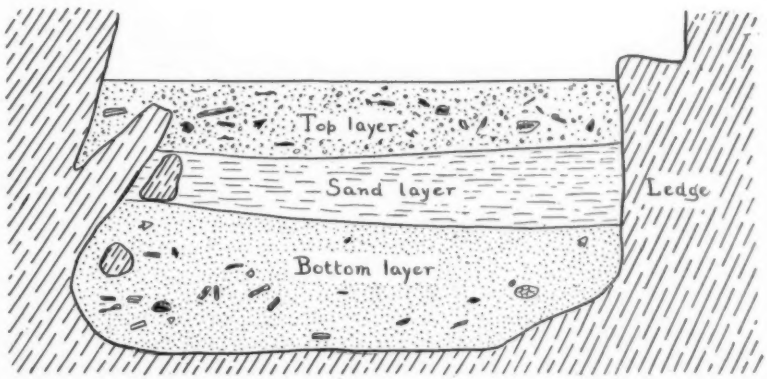


FIG. 8. VERTICAL SECTION OF REFUSE IN FINCH'S ROCK HOUSE, ABOUT MIDWAY OF THE CAVE

Finch House (Fig. 2) reproduced in the model. The original is near Armonk, Westchester County, New York. One point of special interest is the fact that the Finch shelter contained two layers bearing relics separated by sand as shown in the drawing (Fig. 8). As no pottery was found in the bottom layer, it has been inferred that we have here the remains of two different races of Indians, the older not yet advanced to the pottery-making stage. This conclusion, is, however, far from final, for the whole arrangement may be due to accident.

The table case 8B contains objects selected from the Henry Booth collection illustrating the life of the Indians of the Upper Hudson. They are especially interesting on account of the number of ceremonial "banner stones" found in that region, which are apparently not nearly so abundant anywhere else in this vicinity.

In the next table case the section 9A is devoted to the life history of some of the Iroquois tribes other than the Five Nations of western New York, and the following section (9B) shows, as well as possible, the culture of the Iroquois Indians of central New York and objects used by the Indians of New York State in general manufacture or obtained from the Europeans upon the advent of the settlers. In the upright case (10A) there is presented an exhibition of pottery vessels, all but one of which were found within the limits of Greater New York, and some implements from the Iroquois of the Mohawk Valley, besides material illustrating the societies of the Iroquois. On the other side, (10B), the entire case is filled with specimens from the Bolton and Calver collection from Manhattan Island, which will be more fully described below.

The Types of Indian Relics found in and about New York City.

Having now taken a general view of the exhibit, the visitor may be interested in a study of the several kinds of relics found in this locality. As these types are somewhat different from those found in near-by regions, we conclude that the Indians formerly living here had habits and customs different from those of their neighbors. For want of a better name, these long-extinct tribes have been called the New York Coastal Algonkin. The term Algonkin designates the language they spoke, while the adjective defines their habitat.

In the term New York Coastal Algonkin, the writer includes the tribes along the coast from Tottenville, Staten Island, the extreme southern point of the state, to the Connecticut boundary on Long Island Sound, including to a certain extent the shores of New Jersey immediately adjacent to Staten and Manhattan Islands, the east bank of the Hudson River as far north as Yonkers, and exclusive of Long Island except the western end. From the examination of the remains of the New York Coastal Algonkin area preserved in many collections, both public and private, it becomes obvious that the objects found may be roughly divided into three groups: articles of stone, articles of bone and antler, and articles of clay, shell and metal. The first group is, from the imperishable nature of its representatives, naturally the largest and comprises a number of sub-groups to be briefly described and commented upon in this paper. Examples of this type will be found in the table cases previously mentioned. For the following descriptions and historical notes the author has largely drawn on Mr. James K. Finch's and his own contributions to Volume III of the "Anthropological Papers of the American Museum of Natural History" (New York, 1909).

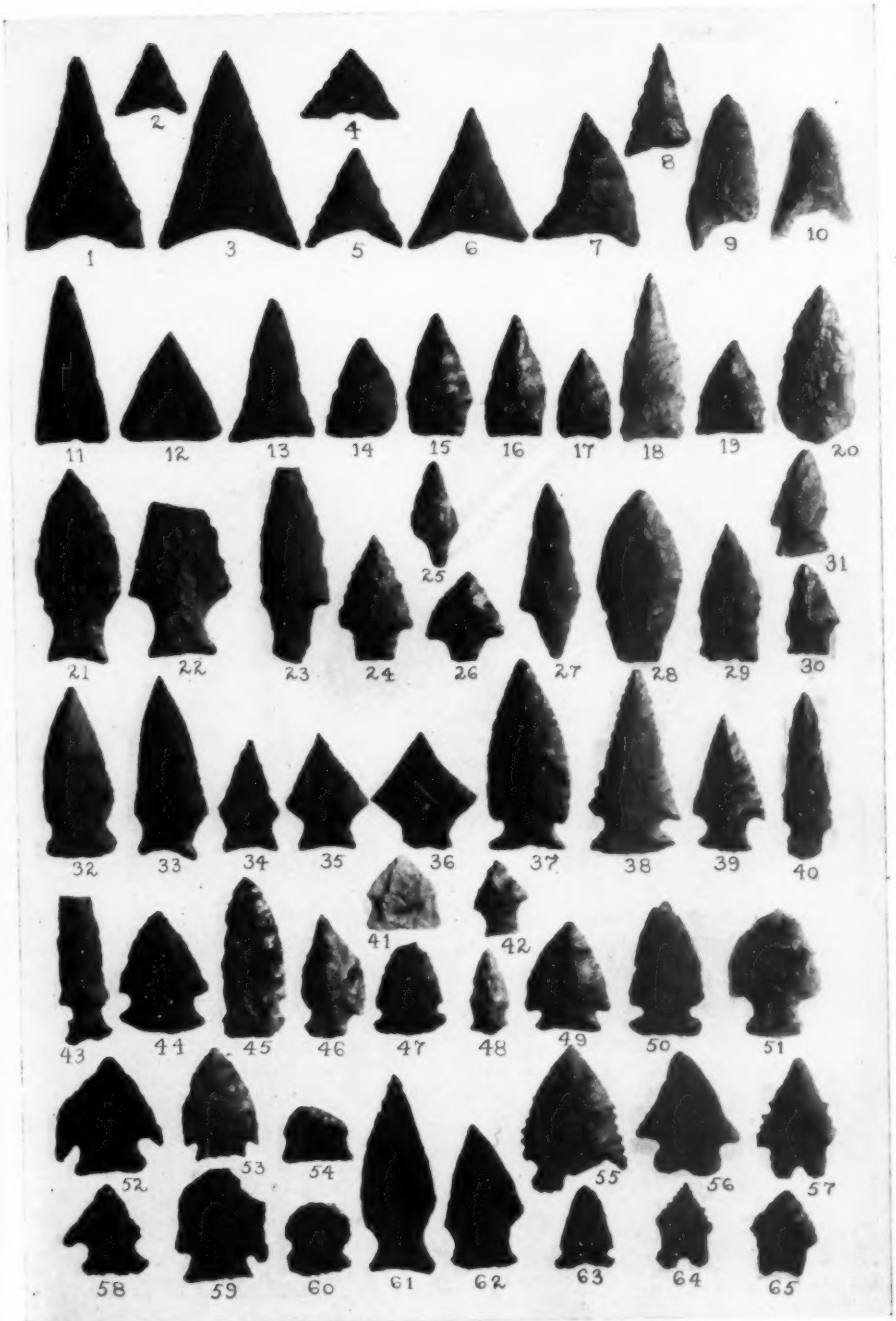


FIG. 9. TYPES OF ARROW POINTS.

Chipped Articles.

Arrow Points (Fig. 9). Two general types may be recognized, and these are the stemmed or notched, and the triangular forms. The former are by far the most abundant, and while these are usually made of the nearest local rock possessing the necessary conchoidal fracture, in some cases they are of material brought from a long distance. Specimens made of pink flint resembling stone from the Flint Ridge of Ohio, and of jasper found to the south of this region have been recorded. Blunt arrow points are rare, the Indians probably preferring wooden arrows for this type. Many of the so-called "blunt-points" found in collections, appear to be scrapers made over from broken arrow points of a large size.

The triangular type has long been regarded by the local collectors of this vicinity as being the type used in war, the argument being that as it has no stem, it was necessarily but loosely fastened in its shaft and, if shot into the body, would be very liable to become detached and remain in the flesh if any attempt were made to withdraw it by tugging at the shaft. While it was no doubt perfectly possible to fasten a point of triangular shape to the shaft as firmly as a notched point, the discoveries of Mr. George H. Pepper at Tottenville, Staten Island, where twenty-three arrow points were found in and among the bones of three Indian skeletons, tend to strengthen this theory. While the majority were of bone or antler, all those made of stone were of this type, and indeed most of the bone points were also triangular in shape. However, it is well to bear in mind that arrow points of triangular type have been used for every purpose by all the early Iroquois tribes of New York.

Spear Points and Knives (Fig. 10). None of the early accounts of contemporary European writers seem to mention the use of spears (other than bone or antler-headed harpoons) by the Indians hereabouts, and it is probable that the larger arrow-point-like forms found were used as knives or cutting tools. They are usually notched or stemmed, rarely triangular, and occasionally round or oval. They vary in size, but it must be remembered that one tool may have had various uses, and that drills, knives and scrapers may often have been combined in one implement.

Scrapers (Figs. 10 and 11). Scrapers were probably used in dressing skins, and in sharpening bone implements, woodworking and for various other purposes. These are usually mere flint flakes chipped to an edge on one side. Nevertheless, notched and stemmed forms, requiring some care in their making do occur. Broken arrow points were occasionally chipped down to serve this purpose. A single serrated scraper has been found.

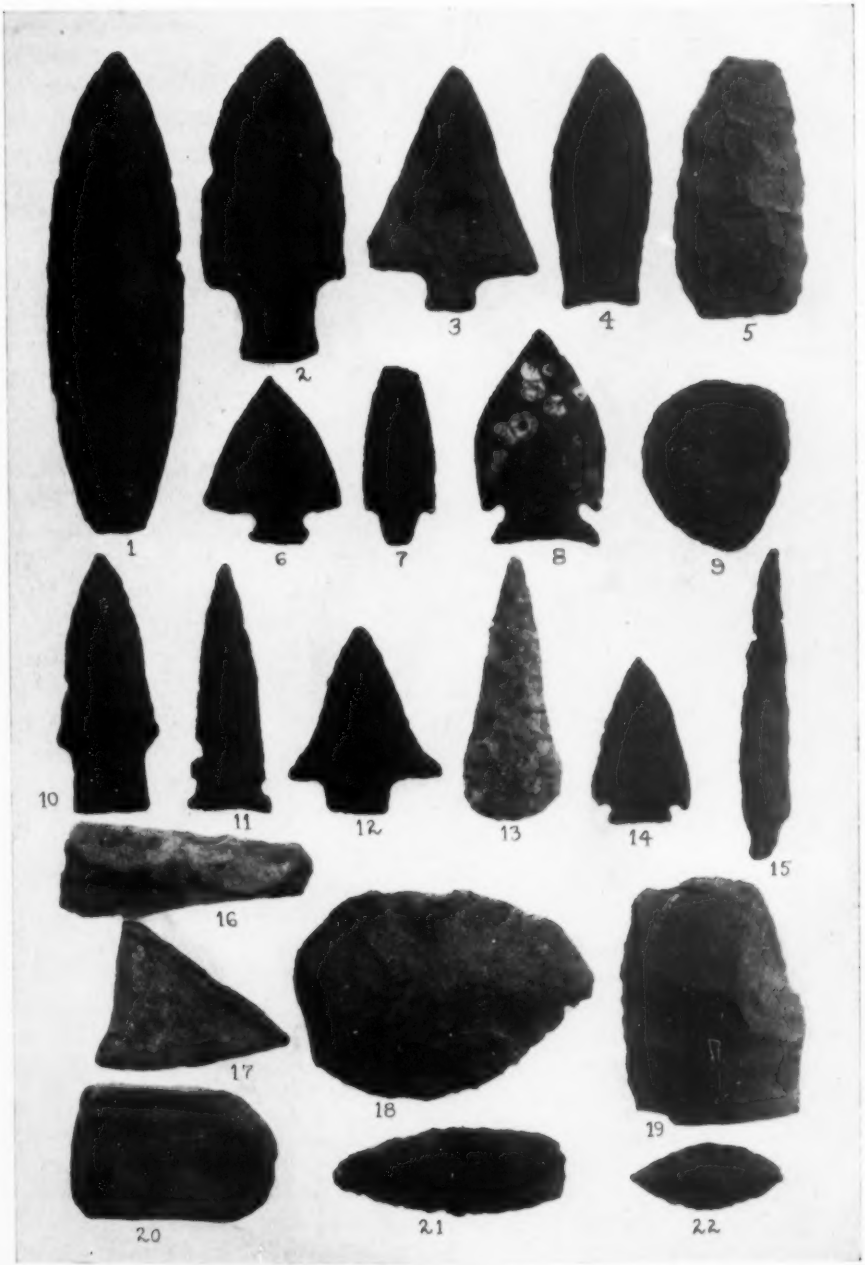


FIG. 10. KNIVES AND SCRAPERS.

These are very rare in both the Algonkian and Iroquoian areas of New England and the Middle Atlantic States. One very large stemmed scraper, of a type more common in the far west, also comes from this locality.

Drills (Fig. 11). These are usually chipped tools presenting an elongated narrow blade and a considerably swollen or expanded base, suitable for grasping in the hand. In some cases the base was absent and those were probably hafted in wood. Specimens whose blades have a square or rectangular cross section are very rare. The finding of cores left in half-drilled objects shows the use of a hollow drill, and it has been suggested that a hard hollow reed used with sand and water on a soft stone would produce this effect. To bear out this assertion, it has been reported that a half-drilled implement has been found (outside this area on the upper Hudson) in which the remains of the reed drill were found in the cavity left by its action.

Rough Stone Articles.

Hammerstones. These vary from simple pebbles picked up and used in the rough, showing merely a battered edge or edges acquired by use, to the pitted forms. They are generally mere pebbles with a pit pecked on two opposite sides, perhaps to aid in grasping with the thumb and forefinger. Some have battered edges, but many have not, suggesting, when round and regular, a use as gaming or "Chunké" stones, or as implements used only in pounding some soft substance. Hammerstones, pitted on one side only, and others with many pits on all sides, occur. These latter may have had some special use, and are not to be confounded with the large flat, slab-like stones having pits only on one side, found in other regions, and perhaps used as receptacles for holding nuts while cracking them. While these are common in the Iroquoian area, they are unknown here.

Large stones, single or double pitted, resembling oversized hammerstones occur, and these may have been used as anvils in chipping flint or for like purposes.

Grooved clubs or mauls, also showing use as hammers are found. These are rare and are usually either rough pebbles, grooved for hafting, as in the case of the grooved axe, or grooved axes, the blades of which have become so battered, broken and rounded by wear as to preclude their further use for chopping.

Net-sinkers. On all sites near the water, either salt or fresh, net-sinkers show the prevalence of fishing. These are of two types. In one case a pebble is notched on opposite sides of either the long or broad axis; in the other a groove is pecked around the entire pebble in the same manner. The

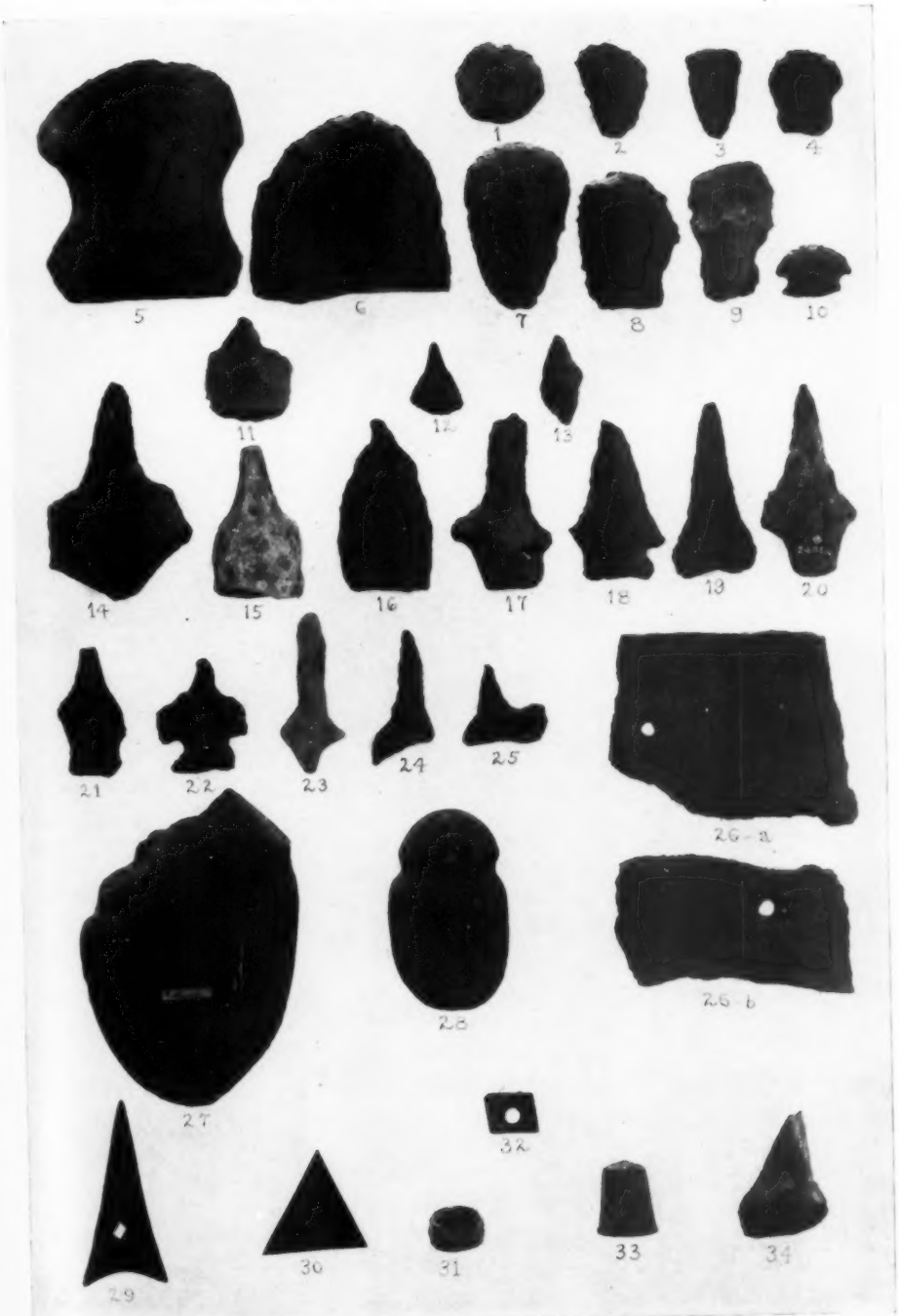


FIG. 11. DRILLS, SCRAPERS AND OTHER OBJECTS.

latter type is comparatively scarce, as the former, being more easily and quickly made, was just as useful to the savage. The modern Cree and Ojibway, residing in the forests north of the Great Lakes, still use pebbles for this purpose, but those observed by the writer were not notched or worked in any way. Occasionally, sinkers notched on both axes are found in this region.

Hoes. These are usually ovoid implements, chipped from trap rock and sometimes notched to facilitate hafting, and sometimes not. They usually show a slight polish on the blade, caused by friction with the ground. This stone type of hoe is the form mentioned by early writers; but perhaps hoes of shell, bone or tortoise shell, and wood were used also. None of these, however, are still in existence.

Hand Choppers. Pebbles chipped to an edge on one side, for use as hand choppers, occur. These are occasionally pitted on both sides.

Grooved Axes (Fig. 12). For the purposes of this paper, the writer, while aware that many grooved axes are well made and polished, has decided to include them under the head of "Rough Stone Articles," as by far the greater majority of the grooved axes and celts from this region lack the polish and finish belonging to other articles later to be described. Grooved axes are of two sorts: *a*, those made of simple pebbles, merely modified by grooving and chipping or pecking an edge; and *b*, axes which have been pecked and worked all over and sometimes polished. The latter (*b*) may be said to include:

1. Groove encircling three sides of blade, one side flat.
2. Ridged groove encircling three sides of blade, one side flat.
3. Groove encircling three sides of blade, longitudinal groove on flat side.
4. Groove encircling three sides of blade, longitudinal groove on flat side and opposite.
5. Groove encircling blade.
6. Ridged groove encircling blade.

A seventh type, having a double groove encircling the blade, may occur in this territory, but has never been reported. A specimen from the Hudson River region, just north of the area here dwelt upon, is in the Henry Booth collection in this Museum. While most worked stone axes have been pecked into shape, a few have been fashioned by chipping, but these seem to be rare.

Grooved axes were hafted in various ways. During the summer of 1908, the eastern Cree living in the vicinity of the southern end of Hudson Bay told the writer that their ancestors, who made and used such axes, hafted them by splitting a stick and setting the blade in it, then binding the handle together with deer-skin (probably rawhide) above and below the split. No specimens of the grooved axe in the original haft seem now to be extant

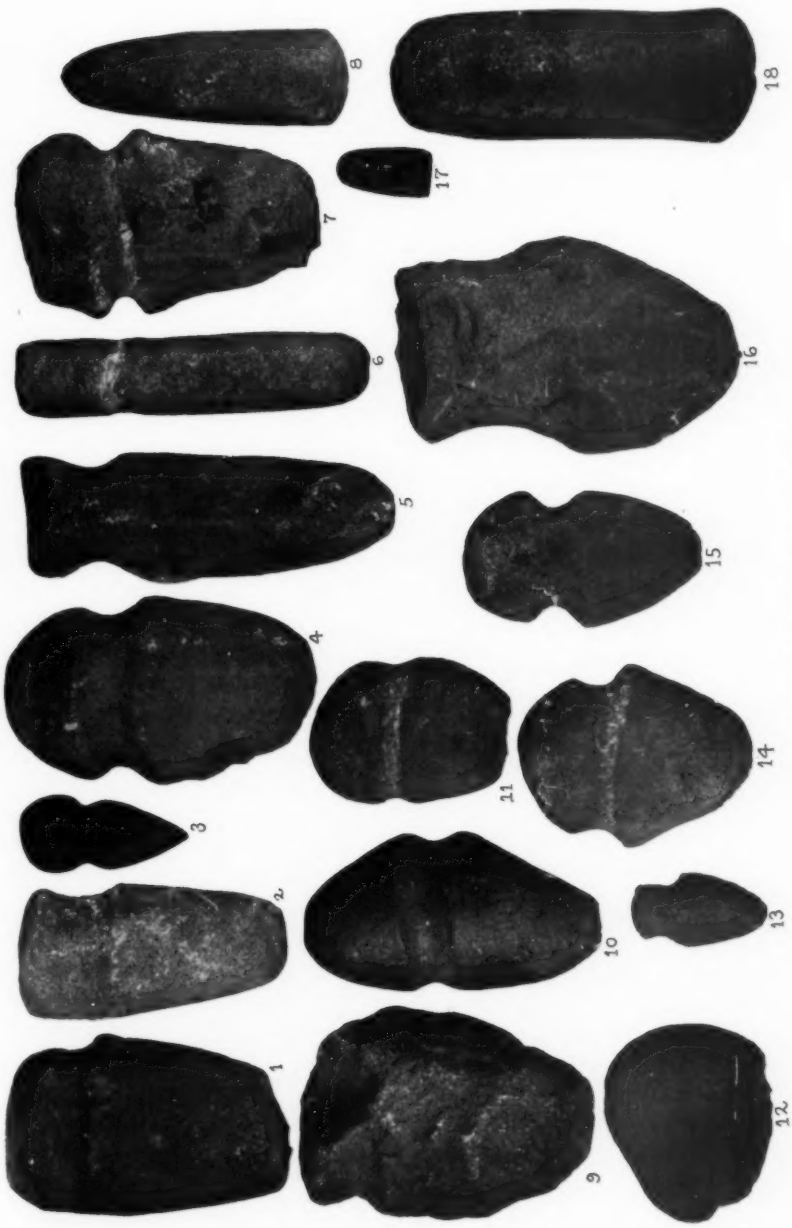


FIG. 12. TYPES OF STONE AXES AND CELTS.

from any locality in the East. From the battered appearance of the butts of these axes, it may have been that they were sometimes used in lieu of mauls or hammers. It is possible that they may have been used in war. It is generally supposed that in cutting down trees, making dug out canoes and other kinds of wood-working, fire was used as an adjunct to the stone axe, the former being the active agent. The process of burning and charring having gone on sufficiently, the stone axe was used to remove the burned portion. However, some stone axes seem sharp enough to cut quite well without the aid of fire.

Celts (Fig. 12). Ungrooved axes or hatchets, usually called celts, are frequent throughout this area; but are nowhere as abundant as the grooved axe, especially near the southern border of the region. The grooved axe seems to have been the typical cutting and chopping tool of the local Algonkin. The widespread idea that the celt was sometimes used unhafted as a skinning tool, has no historic proof, but may possibly have some foundation. The Cree of the southern Hudson Bay region use an edged tool of bone for this purpose, a fact which is somewhat suggestive, although the implement differs in shape from the celt. Celts with one side flat and the other beveled to an edge may have been used as adzes. From the worn and hammered appearance of the polls of some celts, it is possible that many of these implements were used as wedges in splitting wood, after constant manipulation in their chopping capacity had permanently dulled their edges.

The celts of this region are, as a general thing, poorly made, a pebble of suitable shape having an edge ground on it with little or no preliminary shaping. More rarely, however, they were carefully worked all over by pecking and polishing, as in the case of the grooved axe.

In type, aside from the general division of rough and worked celts, we may add that most celts in this region have slightly rounded polls, the bit broader than the butt, although some exceptions have been found. The forms are as follows: *a*, rough stone celts, pebbles with one end ground to an edge, but otherwise scarcely worked: and *b*, worked stone celts, which include the following:

1. Wedge-shaped, poll narrower than bit, and angles rounded; common.
2. Like number one, but with bit much broader than poll. Very rare. Cross-section oval.
3. Like number one, but one side flat, other beveled at one end to make a cutting edge.
4. Like number two, but with cutting edge flaring, broader than body. "Bell mouthed type." Very rare.

North and west of this region, we find the Iroquois territory where most

worked celts are angular, having almost invariably a rectangular cross section and squared butt. Types 1 and 3 also occur, but the celt with the rectangular cross section seems most typical of the Iroquoian region. Many small celts, made of flat fragments or chips of stone, are also found in this area, and these could scarcely have had a use as chopping tools.

In the Niagara watershed and extending eastward as far as the Genesee valley, an angular adze-like form having a trapezoidal cross section occurs. It is found principally in what was the territory of the Attiwandaronk, Kah-

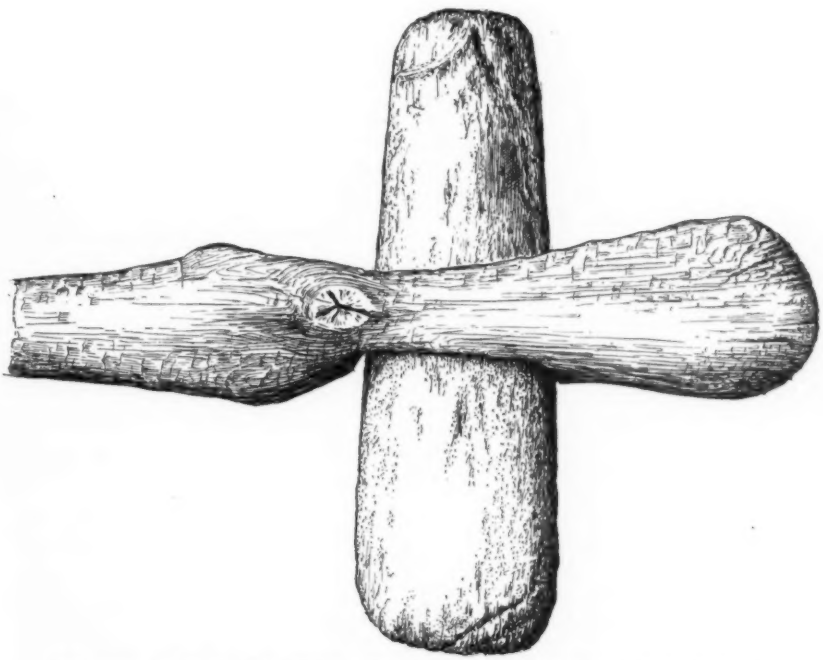


FIG. 13. A HAFTED CELT FROM A POND AT THORNDALE, DUTCHESS CO., N. Y.

Length of celt 16.6 cm.

Kwah, or Neutral Nation (an Iroquoian tribe, early annihilated by the Five Nations). It also occurs, as has been stated, on the sites of villages of the Iroquois proper, but is not abundant. South of the Iroquois in central Pennsylvania, another form which does not occur in this region is the chipped celt, usually of flint or other hard stone. This form is, however, frequent in the country about the headwaters of the Delaware.

In the "American Anthropologist," Vol. 9, No. 2, p. 296 *et seq.*, Mr. C. C. Willoughby has figured and described the celts of the New England

region with remarks on the methods of hafting employed. These seem to be two in number, and consist, in the case of the larger forms, of setting the blade through a hole in the end of a club-like handle, the butt or poll projecting on one side and the blade on the other as in Fig. 13, found in the muck of a pond bottom at Thorndale, Dutchess County, New York, a region once in the Mahican territory. Smaller celts were set into a club-like handle, the butt resting in a hole or socket.

Adzes. These seem to be of two kinds, the first and most simple being celt-like, but flat on one side, the other side being beveled to an edge on one side. The second form differs in having a groove, which is not infrequently ridged. Occasionally, adzes with two parallel grooves occur. They were probably hafted by taking a stick at one end of which projected a short arm at right angles with the shaft, laying the flat side of the blade against this arm and binding it on with sinew, thongs or withes. The groove, of course, was of aid in securing the blade to the handle. Adzes of stone, hafted in this manner, have been obtained on the North Pacific coast. The celt adze seems not uncommon, but the grooved adze is rare, neither form being nearly so abundant as in the New England region.

Gouges. The stone gouge is rare, and seems always to be a plain, single-bladed affair without the transverse grooves so frequently seen in New England specimens, and hereabouts is always easily distinguished from the adze. Less than half a dozen specimens have been seen by the writer from this entire area, although probably quite as much work in wood was done by the New York coastal Algonkin as by the New England Indians.

Pestles. The long pestle occurs throughout the region of the Coastal Algonkin of New York, but is nowhere as abundant as in New England. They seem always to have been used with the wooden block mortar hereabouts, and are mentioned by the early writers as part of the household equipment of the natives. They do not seem to have been used by the Iroquois to the north and west of this area either in early or later times. The wooden pestle of dumb-bell shape seems to have been preferred by them. The latter is used by the Canadian Delaware and may have taken the place of the long stone pestle to a great extent in this region.

Mullers, Grinders, and Polishing Stones. These are frequent, and consist merely of rounded pebbles, shaped and worn by use, probably most often in crushing corn. They are mentioned by De Vries as being used by the Indians with a flat stone slab for grinding corn when traveling. Some seem to have been used for polishing stone implements, but it seems hard to draw the line, as the appearance gained from friction would be quite similar. Such mullers and their attendant slabs, used for preparing corn meal have been collected within a few years in use among the Oneida Iroquois of New York, one specimen being in the American Museum collection.

Sinew Stones. These are pebbles showing grooves along the edges, popularly supposed to have been worn there by rubbing thongs and sinews across the edges to shape them. They occur generally, but are not common.

Stone Mortars. These are common, but rather local, some sites having none at all, and others a good many. One locality on Staten Island is notable for the numbers found there, whereas they are rare elsewhere in that vicinity. They may be divided into the following types:

1. Portable mortar, hole on one side.
2. Portable mortar, hole on both sides (New Jersey type).
3. Portable slab mortar or metate, used on one or both sides.
4. Bowlder mortar, one or more holes, immovable.

The first two types are the most abundant, the third is not uncommon; but the fourth is very rare, only one or two being reported. As above stated, De Vries claims that the portable mortars were used in bread-making, while the Indians were traveling, but certainly the majority of those found are far too heavy for this purpose.

Pigments and Paint-cups. Fragments of pigments such as graphite and limonite, showing the marks of scratching with scrapers, are found, which have apparently supplied the material for painting. Worked geodes are common on many sites. These show traces of chipping in some instances and may have been paint cups. There is a tiny pestle-shaped pebble in the Museum collection from Westchester County, which is said to have been found with a geode of this type. The popular theory is that such geodes were used as "paint cups" and this seems probable.

Stone Plummets. These are very rare, in contrast to their abundance in the New England region. They consist usually of small worked egg-shaped stones, grooved at one end, probably for suspension. The writer has seen but one from this area. Their use is problematic.

Semilunar Knives. Knives of rubbed slate, similar in appearance to the "ulu" or woman's knife of the Eskimo are found, though rarely, in this region. While sometimes ascribed to Eskimo influence or contact, it is possible that this form (which occurs throughout New England), judging by its distribution, may have been native to the eastern Algonkin also. The eastern Cree still use knives of this type as scrapers. Like most other forms common in New England, it is less abundant in the southern part of this area.

Stone Beads. Various pebbles generally perforated naturally are to be found on some sites, and may or may not have been used as beads or pendants. On Staten Island, at Watchogue, Mr. Isaiah Merrill once owned a number of square beads of pinkish steatite (?), all but one of which have been lost, and which he claims were found on his farm.

Polished Stone Articles.

Gorgets. Two types of the gorget occur. These are the single-holed pendant form, which is the less abundant of the two, and the double-holed type. The latter is flat, rectangular in shape and generally well polished. It usually has two perforations a short distance from the middle. The modern Lenapé of Canada claim to have used these as hair ornaments. Probably the two-holed variety is typical of the Algonkian peoples of this region, the single-holed form being on the other hand, the most abundant on old Iroquoian sites. Specimens of the latter have been obtained in use among the Canadian Iroquois, and some of them are in the Museum collections.

Amulets. Certain problematic articles of the "bar" and even "bird amulet" type have been found, but these are probably exotic in origin and are not characteristic of the archæology of the region in question.

Banner Stones. These beautiful polished stone implements of unknown use may be divided into three great classes, with several sub-types as follows:

1. Notched banner stones.
2. Grooved banner stones.
   a. Groove on both sides.
   b. Groove on one side.
3. Perforated banner stones.
   a. Plain.
   b. Butterfly.

All three types seem equally abundant, but the notched banner stones appear to be the oldest form and occur under circumstances pointing to great relative antiquity. They are found, however, on the more recent sites as well. Both notched and grooved banner stones are usually more rough in appearance than the perforated type, and the writer has never seen a polished specimen of the first class. On the other hand, the grooved variety frequently exhibits the high degree of finish characteristic of the perforated forms. Banner stones grooved only on one side are less common than the other forms. While the latter class is generally made of slate, steatite or some similar soft and easily worked material the notched and grooved forms, especially the former, are often formed either from naturally-shaped pebbles or chipped roughly into shape. Implements, usually naturally-shaped stones with little working, without notches, grooves or perforations, but greatly resembling the notched and grooved banner stones in shape, are not infrequently found on aboriginal sites hereabouts and may have served as banner stones. There seem to be neither records nor plausible theories as to their use.

Pipes. Stone pipes, invariably made of steatite, are very rare. Four types have been noted as follows:

1. Monitor or platform pipe, platform not projecting before the bowl.
2. Monitor or platform pipe, platform projecting before bowl, with or without tiny carved stem or mouthpiece. Of the latter, one specimen is known.
3. Trumpet-shaped stone pipe.
4. Rectangular stone pipe, human face carved on front of bowl.

It may be remarked that more stone pipes have been reported from the Indian cemetery at Burial Ridge, Tottenville, Staten Island, than from all the rest of the area put together. The second and third types are represented by one specimen each from Burial Ridge and from nowhere else in this region. Four or five pipes of the first class have been found there as well. The last class is represented by a single specimen obtained by Mr. W. L. Calver at Inwood, Manhattan Island. Undoubtedly the clay pipe was the most common form used in this locality.

Steatite Vessels. These are not at all abundant, though occurring almost everywhere. They were doubtless all imported from New England, as there are no steatite quarries within the range of the New York Coastal Algonkin. The single form found is that common in the east, an oblong, fairly deep vessel with a lug, ear or handle at each end (Fig. 14j). Occasionally, such vessels are ornamented by rude incisions along the rim.

Articles of Clay.

Pottery Pipes are common everywhere. They are usually manufactured of a better quality of clay than that used for vessels, and bear fairly similar designs. They are susceptible of division into the following classes:

1. Straight pipe, bowl expanding slightly.
2. Bowl much larger than stem, leaving it at an angle of forty-five degrees. Stem round.
3. Same as number 2, but stem angular and much flattened.
4. Effigy pipes, (represented by a pottery human head apparently broken from a pipe bowl, obtained by Mr. M. R. Harrington at Port Washington, Long Island).

The straight pipe seems to have been obtained only on Staten Island on the north shore in the region occupied by the Hackensack. While nowhere as abundant as upon the Iroquoian sites of central and western New York, the clay pipe is rather common and is a prominent feature in the coast culture of New York (Fig. 15a). It is more abundant perhaps in the southern part

of the area, but this may well be due to the fact that data from this region are more easily accessible. The triangular-stemmed "trumpet" pipe so common on the Iroquoian sites is unknown in this region.

Pottery Vessels.

The pottery of this region may all be considered as being either the native Algonkian in type or showing Iroquoian influence with a third and intermediate variety. Algonkian vessels may be divided into the following groups according to shape:

1. Conical, pointed bottom, slightly swollen sides, circumference largest at the mouth, — the typical Algonkian pot of this area, Fig. 14a.

2. Like number 1, but much rounder and broader, Fig. 14b.

3. Bottom pointed, sides slightly swollen, neck slightly constricted, Fig. 14c.

4. Identical with number 2, except that just below the beginning of the neck, occur small raised lugs, ears or handles. This is rare from this area, Fig. 14d.

5. Rounded bottom, somewhat constricted neck, lip sometimes flaring, or even turning down and back, Fig. 14e.

The intermediate types are as follows:

6 Rounded bottom, constricted neck, narrow raised rim or collar, Fig. 14f.

7. Like number 6, but with sides more elongated and bottom more oval than round, heavier collar, generally notched angle, with or without a series of small humps or projections at intervals, Fig. 14g.

The Iroquoian types are as follows:

8. Mouth rounded, collar or rim heavy, with humps or peaks at intervals, angle notched, neck constricted and bottom rounded; can stand by itself, an unknown feature in local Algonkian vessels, Fig. 14h.

9. Same as number 7, but with mouth square, and humps at every angle. Much less common than the preceding, Fig. 14i.

In size, the vessels range from small toy-like pots to jars of very large capacity. In general they appear to have been made by the coil process, and are tempered with pounded stone or fine gravel, mica or burned or pounded shell. Sherds showing tempering by fibre or some other substance that disappeared in firing are rarely found. When vessels were cracked or broken, a series of holes was bored opposite each other on either side of the break and the parts laced together, rendering the vessel capable of storing dry objects, at least.

Life forms are exceedingly rare in local ceramic art. From Manhattan Island and Van Cortlandt Park, there come a number of specimens showing incised human (?) faces. This is not an uncommon form on Iroquoian sites in central and western New York. On the Bowman's Brook site at Mariner's Harbor, Staten Island fragments of a typically Algonkian pot were obtained which bore at intervals, rude raised faces. With the sole exception of a rather well-modeled clay face, apparently broken from the

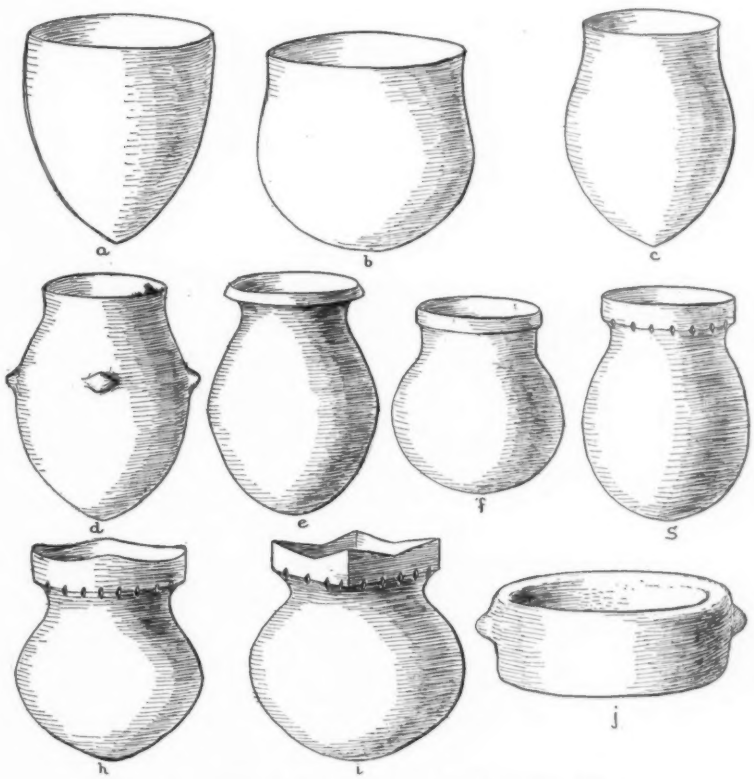


FIG. 14. POTTERY FORMS OF THE COASTAL ALGONKIN.

bowl of a pipe (Fig. 15b) found at Port Washington, Long Island, by Mr. M. R. Harrington, this brief statement concludes the list of pottery life forms reported from this area, although others may yet be found here, since some interesting objects have been collected in immediately adjacent territory.

The forms of decoration consist of stamping with a stamp, roulette or paddle, and incision (Figs. 16 and 17.) Occasionally, but very rarely,

stucco work occurs. Under stamping we can enumerate the following processes:

1. Impression with the rounded end of a stick (rare).
2. Impression with the end of a quill, or hollow reed, leaving a circular depression with a tiny lump or nipple (rare) in the center.
3. Impression with a section of a hollow reed, making a stamped circle (rare).
4. Impression with finger nail (doubtful, but perhaps used on some sherds from Manhattan Island).
5. Impression of the edge of a scallop shell.
6. Impression with a carved bone, antler or wooden stamp.
7. Impression of a cord-wrapped stick.
8. Impression with roulette.

FIG. 15. TYPICAL ALGONKIAN POTTERY PIPE AND FRAGMENT OF AN EFFIGY PIPE FROM PORT WASHINGTON, L. I

Under the head of decoration by incision we can enumerate the following:

9. Incised decoration, probably made with a stick.
10. Incised decoration, possibly made with a flint object (only one specimen at hand).

The paddle was frequently used to finish the sides and bottom of the pot by imparting an appearance of pressure with fabric when the clay was wet.

11. Stucco. Occasionally, ridges of clay placed on the rim for ornament appear to have been added after the shaping of the vessel.

Ornamentation is usually external, and vessels, either Algonkian or Iroquoian, are rarely ornamented below the rim, although occasionally the designs run part way down the side in the case of the Algonkian forms. Where decoration has been applied by one of the stamping processes, and more rarely by incision, it is sometimes continued over the lip or rim for an inch or less on the inside. This only occurs in the typical Algonkian forms, and is never seen when incised ornamentation is used. The rims of Iroquoian vessels are never ornamented on the interior, nor is stamping so frequently practised on vessels of this class. The intermediate forms, at least the first of the two mentioned, are frequently ornamented on the interior

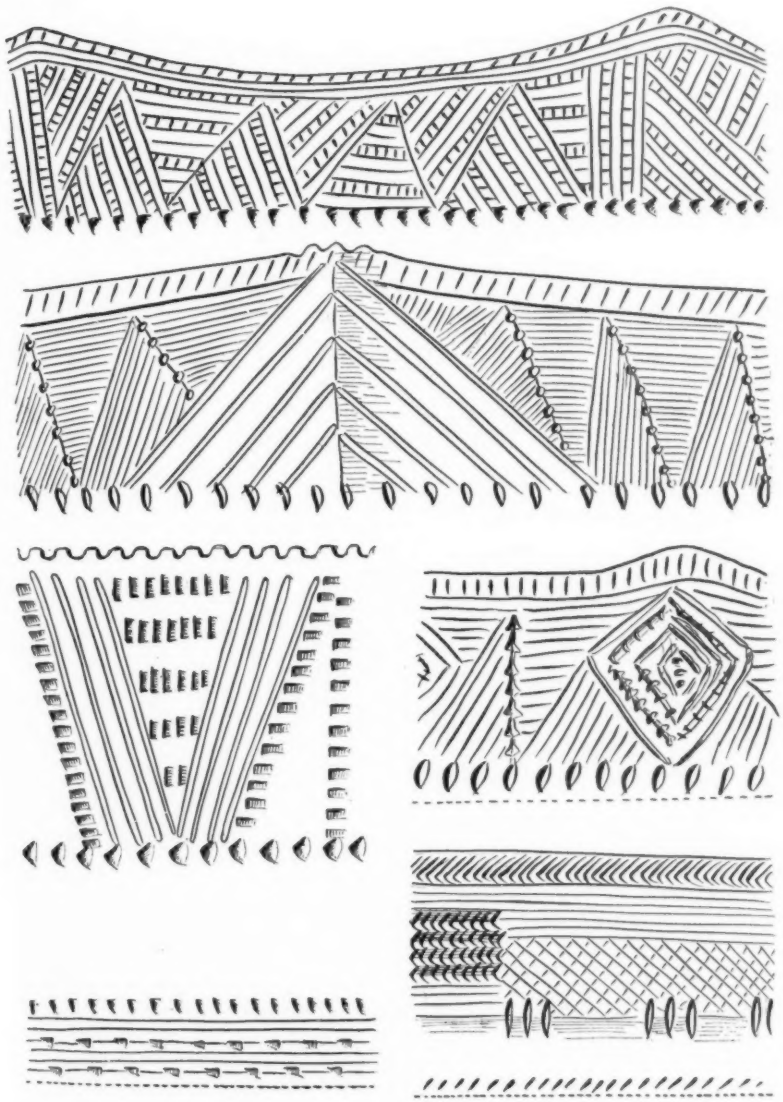


FIG. 16. INCISED DESIGNS FROM POTTERY VESSELS.

a, *b*, and *d*, designs from Iroquoian vessels; *c*, design from an Algonkian vessel; *e*, design from a vessel of the Iroquoian type from a Connecticut rock-shelter, introduced here for comparison.

of the lip. This internal decoration is much more common in the southern portion of this area than elsewhere in the vicinity.

In design, we must of course, give up all thought of trying to obtain symbolism, if such there were, for there are no sources now left upon which to base our assumptions. Certain conventional types of decoration seem to have been in vogue, usually consisting in rows of stamped or incised parallel lines and much more rarely of dots regularly arranged in the same manner. Zigzag, chevron and "herring bone" patterns are the most common, but other angular forms occur, and rows of parallel lines encircling the vessel are sometimes to be found. Stamping and incision as decorative processes never seem to occur on the same vessel. Curvilinear decoration is exceedingly rare, and not enough material is at hand to show that patterns were used, possibly these were scrolls of some form. On account of the lack of material, it cannot be determined whether the designs on the Algonkian

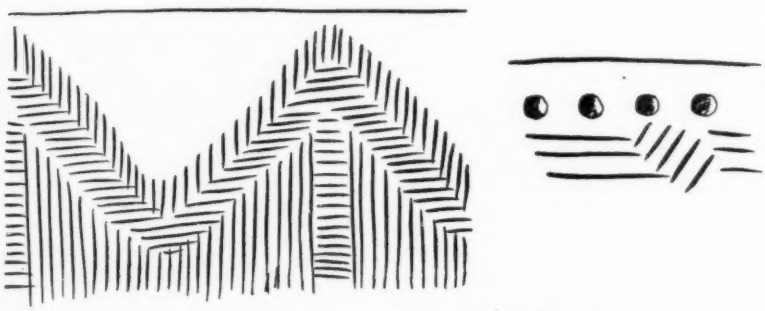


FIG. 17. INCISED DESIGNS FROM ALGONKIAN VESSELS.

vessels differ from those on the Iroquoian, except in a very general and unsatisfactory way.

The angle formed where the heavy rim or collar leaves the constricted neck of the Iroquoian vessel is almost invariably notched, and as such collars and angles do not occur on vessels of the true Algonkian type, this feature is necessarily absent from them. It is noticeable that Iroquoian vessels are usually decorated with incised designs, rather than stamped patterns.

Pottery is found abundantly on the majority of the sites in this district; but, while very much more common than in the New England area, it does not equal in abundance that from the Iroquois country. It is rarely found buried in graves with skeletons as in the Iroquoian area; when sometimes found in graves, however, it is usually at some distance from the human remains and apparently not connected with them. Whole or nearly whole vessels are exceedingly rare and the number of those found up to date may

easily be counted upon the fingers. Potsherds taken from pits or shell heaps, where they have not been exposed to the action of the weather, are often as thickly covered with grease as when they were broken and cast aside.

Articles of Metal.

Beads. Beads of native metal, consisting simply of pieces of hammered sheet copper rolled into small tubes, have been found, but they are very rare. Copper salts, but no objects, were found upon the bones, especially on those of the head and neck, of a child's skeleton at Burial Ridge, Tottenville, Staten Island, which seemed to predicate the use of copper beads. A great many beads of *olivella* shell, some of them discolored by copper salts, were found about the neck of the skeleton. A single celt of copper is said to have been found in Westchester County, probably on Croton Neck, slightly above the limit of the territory treated in this paper.[1]

Articles of Shell.

Wampum. Objects of shell are not at all common, and notwithstanding the coast region of New York was one of the best known localities for wampum manufacture on the continent, wampum beads are almost unknown from local sites. With the exception of completed beads, most of which may have been shipped into the interior, wampum may be found in all stages of manufacture. We refer to the white wampum, for traces of the "black" (blue) wampum made from the hard clam or quahog are so far not reported. The process of manufacture may be shown by shells with the outer whorls broken away in steps until the innermost solid column is reached, ground and polished at the end, and needing only cutting off into sections and perforations to make the finished white wampum bead. These do not occur on all sites, though they have been found here and there throughout the region. Ninety-six conch shells with the outer whorls broken entirely away were found in a grave at Burial Ridge, Tottenville, Staten Island, about the head and neck of a skeleton.

Pendants. Occasionally oyster and clam shells, found unworked save for perforations in them, may have been pendants or ornaments, but certainly have little æsthetic value.

Scrapers. Clam shells seem to have been used as scrapers and some are

[1] Native copper occurs in the New Jersey trap ridges, within a few miles of New York City, an important source in Colonial times being near Boundbrook 30 miles from the lower end of Manhattan Island. Bowlders of native copper occur in the glacial drift. Editor.

occasionally found with one edge showing the effect of rubbing and wearing. These are rare, however. Some may have been pottery smoothers. Clam shells have been reported which contained central perforations and were identical in appearance with some shell pottery scrapers and smoothers collected by Mr. M. R. Harrington among the Catawba. Contemporary writers mention the use of knives made of shell.

Pottery Tempering. This was sometimes done with calcined and pounded shells, but was uncommon, considering the abundance of the material at hand. Pounded stone or gravel seems to have been more favored.

Pottery Stamps. The corrugated edge of a scallop shell was frequently used as a stamp for pottery, as may be seen by examining the potsherds from this region.

Articles of Bone and Antler.

Objects of bone and antler, while perhaps more abundant here than in New England, are far less plentiful in form and number than in the Iroquoian area. Cut bones are frequent in most shell pits and heaps. They were cut by grooving the bone partly through on all sides, probably with a flint knife, and breaking.

Bone Awls. These utensils are the most common of all bone articles in this region and are found in almost every part of the area. Some are merely sharpened slivers, but others show a considerable degree of work, and are well finished and polished. They are usually made of deer or other mammal bone, but sometimes from the leg bones of birds.

In some instances, the joint of the bone is left for a handle, but this is often cut off. Grooved, perforated or decorated bone awls are extremely rare in this region. While it is generally considered that these bone tools were used as awls in sewing leather, as by modern shoemakers, nevertheless, they may have served as forks in removing hot morsels from the pot or for a number of other purposes. The latter supposition is supported by the abundance of bone awls found in some shell pits. The northern Cree of the Hudson Bay region use a similar bone implement as the catching or striking pin in the "cup and ball" game.

Bone Needles. These are rare, but found in most localities. They are generally made of the curved ribs of mammals and are six or eight inches long, or even longer. They are generally broken across the eye, which is usually midway between the ends. A few with the perforation at one end have been reported.

Bone Arrow Points, usually hollow and conical in shape, have been found,

especially at Tottenville, Staten Island, in the Burial Ridge. They are rather rare, but this may be due to the fact that conditions are not suitable for their preservation in most localities. Others are flat and triangular in shape.

Harpoons. No actual barbed bone harpoons, such as occur in the Iroquois country have been reported from this region; although the writer has seen what appeared to be part of one from Shinnecock Hills, Long Island, whence comes a harpoon barb of bone, found by the writer, now in the Museum collection, which was apparently made to tie to a wooden shaft. While neither of these forms seems to occur within this region, several naturally barbed spines from the tail of the sting-ray, found on the Bowman's Brook site, at Mariner's Harbor, Staten Island, may have been used as harpoons or fish spears, for which purpose they were admirably suited by nature. Long, narrow, chipped stone arrow-heads are generally called "fish points", but they do not seem peculiarly adapted for this purpose and the name is probably a misnomer. No bone fish hooks are reported from hereabouts, though suggested by early writers.

Bone Beads and Tubes. While so abundant on Iroquoian sites, tubes and beads made of hollow bird or other animal bones, polished and cut in sections, are very rare here.

Draw Shaves, or Beaming Tools, made of bone, and probably used for removing the hair from skins, were made by splitting the bone of a deer's leg, leaving a sharp blade in the middle with the joints on either end as handles. The writer has seen none from this immediate region, but they are reported by Mr. M. R. Harrington. A number were obtained for the Museum by Mr. Ernst Volk in the Lenapé sites near Trenton, New Jersey. An implement, evidently made of the scapula of a deer, and perhaps used as a scraper, was found in a grave at Burial Ridge, Tottenville, Staten Island, by Mr. George H. Pepper.

Worked Teeth. Perforated teeth of the bear, wolf and other animals, so abundant on Iroquoian sites never seem to be found here. Beavers' teeth, cut and ground to an edge, occur, and may have been used as chisels, or primitive crooked knives, or both, as they were till recently by some of the eastern Canadian Algonkin. Other cut beaver teeth may have served as dice or counters in gaming.

Turtle Shell Cups. These are common, and consist merely of the bony carapace of the box turtle (*Tranene caroline*), scraped and cleaned inside, the ribs being cut away from the covering to finish the utensil for use.

Antler Implements. Deer antlers and fragments of antler, worked and unworked, occur in all shell heaps and pits. When whole antlers are found, they usually show at the base the marks of the axe or other implement used

to detach them from the skull. Cut antler prongs, prongs broken from the main shaft and others partly hollowed and sharpened show the process of manufacture of antler arrow points. These are characteristic of this area and are usually conical in shape, hollowed to receive the shaft, and with one or more barbs; not infrequently, however, they are diamond-shaped in cross section. The shaft fitted into the hollow socket as in the case of the conical bone arrow points. A large number were found in and among the bones of human skeletons in a grave at the Burial Ridge, Tottenville, Staten Island.

Cylinders, neatly cut and worked all over, or cylindrical tines made of deer antler only cut and rounded at the ends, are not infrequent, and were probably used as flaking tools in making and finishing arrow points by pressure. One broken cylinder or pin, found on the Bowman's Brook site, Mariner's Harbor, Staten Island, had a rounded, neatly carved head. This specimen, however, seems to be unique.

Pottery stamps, perhaps of antler or bone, but which may be of wood, seem to have been used, judging by the decorations of many pottery sherds. A pottery stamp, carved from antler, was found slightly east of this region, at Dosoris, Glen Cove, Long Island, by Mr. M. R. Harrington, and is now in the Museum collection.

Trade Articles.

In spite of the frequent mention by old writers of barter of European for Indian goods, the amount of trade material found is small indeed. While it is abundant in the Iroquoian area, all that has ever been found here consists of a few round-socketed iron tomahawks, iron hoes, brass or copper arrow points of various styles, a little porcelain, a few glass beads, Venetian and plain, and some old pipes, notably those stamped "R. Tippet" on the bowl. All these articles are very rare here, and for this no adequate explanation can be given.

Résumé.

This area was inhabited during historic times by the following tribes:[1]

A. The Lenni Lenapé, or Delaware, ranging from the Raritan River, including Staten Island, to Saugerties on the west bank of the Hudson.

[1] On the map (Fig. 18), these tribes are shown together with the Long Island and other neighboring tribes as indicated by Beauchamp in the map accompanying his "Aboriginal Occupation of New York," New York State Museum, Bulletin 32, Albany, 1900.

Raritan or Assanhican.
Hackensack.
Tappan.
Aquakanonk.
Haverstraw.

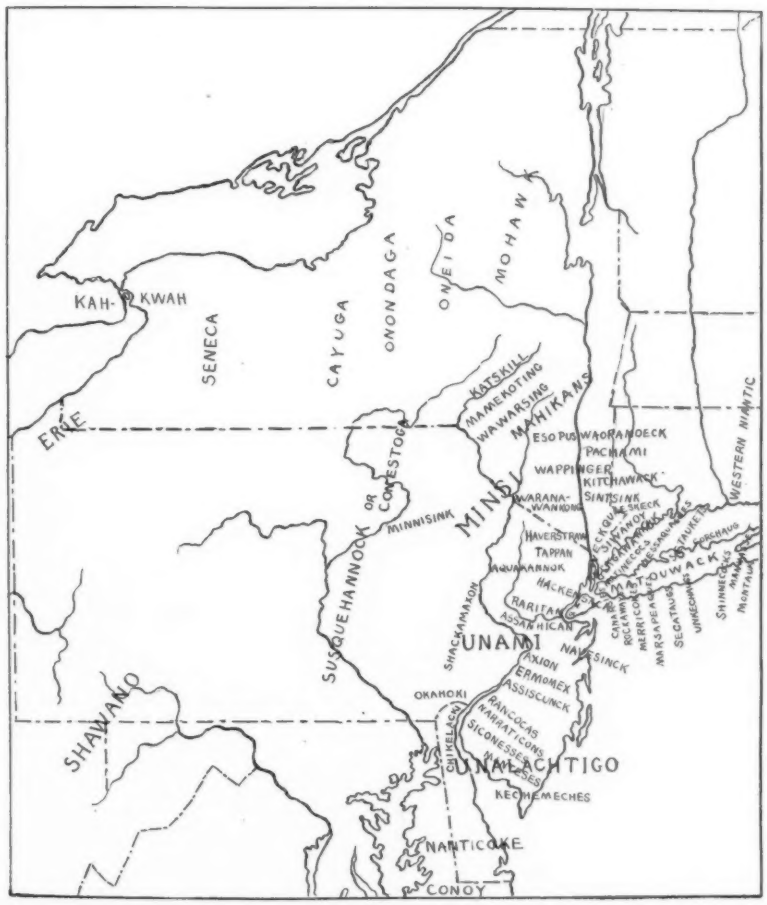


FIG. 18. MAP SHOWING THE LOCATION OF THE NEW YORK COASTAL ALGONKIN AND THEIR NEIGHBORS.

Waranawankong.

B. The Wappinger Confederacy ranging along the east bank of the Hudson, eastward to Connecticut, from Manhattan Island.

Rechgawawank or Manhattan.

Siwanoy.
Weckquaskeck.
Wappinger.

C. Montauk or Matouwack Confederacy.
Canarsie.

These tribes were surrounded on all sides by neighbors of the same stock, who differed somewhat in their language and culture. On the south and west, lay the Lenni Lenapé, or Delaware proper; on the north, the Manhattan, and on the east the New England tribes. Almost without exception, these natives were displaced early in the history of this country, and have been long since expatriated or exterminated. A very few mixed bloods may yet be found on Staten Island, Long Island and in Westchester County, but their percentage of Indian blood is extremely low.

The remains of aboriginal life now to be found, consist of shell heaps, occurring at every convenient point along the coast, on the rivers, and, more rarely, inland; shell, refuse, and fire pits; camp, village and burial sites; and rock and cave shelters. With one prominent exception,[1] few or no relics have been found in graves. The typical interment was of the flexed variety, but bone burials are not infrequent.

Dog skeletons complete and intact, bearing the appearance of having been laid out, are sometimes found buried in separate graves. Some writers have supposed that these individual dog burials are the remains of "white dog feasts" or kindred practices, because the Iroquois even up to the present day hold such ceremonies. The white dog is entirely cremated by the Iroquois, and so far as we have been able to find out, there is no record of such occurrences among the coastal Algonkin; hence, there seems no reason to attribute this custom to them since other Iroquois traits were so infrequent. It seems more probable that such burials are simply those of pet animals, interred as we to-day honor a faithful dog.

Occasionally, the skeletons of dogs and rarely of other animals have been found in graves associated with human bones. The finding of arrow-heads among the ribs of some of these, and other circumstances, seem to point to a practice of killing a favorite animal on the death of its owner to accompany or protect the spirit of its master on the journey to the hereafter.

From their appearance and position, many graves seem to indicate that the dead may sometimes have been buried under the lodge, especially in time of winter, when the ground outside was frozen too hard to permit grave digging. Others under the same circumstances seem to have been buried in refuse pits. The remains further indicate that "feasts of the dead," were

[1] Burial Ridge, Tottenville, Staten Island.

also held at the time of the interment, judging by the quantity of oyster shells and animal bones in and near the graves. Some graves have rows or layers of oyster shells, with the sharp cutting edge upward, placed above the bodies as if to prevent wild animals from disinterring and devouring the dead.

An interesting fact, brought to light by the rock-shelter work of Messrs. Schrabisch and Harrington in their explorations in New Jersey and Westchester County, New York, is that in the lowest and oldest refuse layers of these shelters pottery does not occur. It would be ill advised to infer from this that the earliest occupants were peoples of another culture from the surrounding village dwellers, as the other artifacts found are quite similar to the implements of the latter. Many reasons for this lack of pottery, such as the more easy transportation of vessels of bark or wood through the mountains and hills, suggest themselves, though they are more or less nullified by the presence of pottery in the upper layers. The upper layer, however, may have been made during the period when the natives were being displaced by Europeans and at the same time subjected to Iroquoian raids, when the villages would naturally be abandoned from time to time, for refuge among the cliffs and caves of the mountain fastnesses.

It has been suggested that the rock and cave shelters are remains of an older occupation by people with or without the same culture as the later known savages. The nature of the finds does not support this view, for the specimens obtained are often of as good workmanship as the best to be found in the villages and cemeteries of the latter, while pottery, on the other hand, occurs on the oldest known Algonkian sites. It seems most probable to the writer that, like the shell heaps, the rock and cave shelters form but a component part, or phase, of the local culture, perhaps a little specialized from usage and environment, but contemporary with the villages, shell heaps and cemeteries of the lowlands.

Mounds and earthworks do not occur in the region under consideration, nor does it appear that most of the Indian villages here were fortified, unless they were slightly stockaded. A number of instances of this are known historically, however, and a few earthworks occur just beyond this area.[1]

The remains found do not bear any appearance of very great geological antiquity. In a few instances, rock-shelters, shell heaps and village sites seem to possess a relative antiquity; but the oldest known remains, in every case, may be placed as Algonkian with considerable certainty. No paleoliths have been reported, and it would seem from the comparative lack of antiquity of the remains that the natives could not have lived in this region for many centuries before the advent of the whites. The accounts of con-

[1] An earthwork at Croton Point on the Hudson has been excavated by Mr. M. R. Harrington for the American Museum.

temporary writers prove conclusively that these archæological remains, if not those left by Indians found here by the early Dutch and English settlers, must have been from people of very similar culture. In culture, the local Indians were not as high as the Iroquois, nor perhaps as the Lenapé or Delaware proper from whom they sprang; but they compare very favorably with the New England tribes. Absence and scarcity of certain artifacts such as steatite vessels, the long stone pestle, the gouge, adze and plummet, and the abundance and character of bone and pottery articles show them to have been intermediate in character between the Lenapé on the south and west, and the New England tribes on the east and north; and consultations of the old European contemporaries show that this was the case linguistically as well as culturally. Examination of the remains also shows that the influence of the Lenapé on the west, and of the New England peoples on the east, was most strongly felt near their respective borders. Iroquoian influence was strong, as evinced by the pottery, and there is also documentary evidence to this effect. Finally, as is frequent throughout most of eastern North America, the archæological remains may be definitely placed as belonging to the native Indian tribes who held the country at the time of its discovery or to their immediate ancestors.

Historical Notes on the Indians of Manhattan.[1]

Historical references to the Indians who occupied this territory in the early days are very confusing and contradictory. There seems to be a great deal of trouble in the use of the word Manhattan. Van der Donck in 1633 classified the Indians of this section by language, and said, "Four distinct languages — namely Manhattan, Minqua, Savanos and Wappanoos" — are spoken by Indians. "With the Manhattans we include those who live in the neighboring places along the North River, on Long Island, and at the Neversinks."[2] It is probable that "it was.... this classification by dialect that led the Dutch to the adoption of the generic title of Manhattans as the name of the people among whom they made settlements."[3] De Laet wrote that "on the east side, on the mainland, dwell the Manhattans," and in 1632 Wassenaer adds that they are "a bad race of savages, who have always been unfriendly to our people" and that "on the west side are the Sanhikans, who are the deadly enemies of the Manhattans."[4] "When Hudson returned from his trip up the River which now

[1] First paragraph by James K. Finch.
[2] Wilson, Memorial History of N. Y., Vol. I, p. 34.
[3] Ibid., p. 49.
[4] Ibid., p. 34.

bears his name, he was attacked by Indians in birch or dug-out (?) canoes at the mouth of Spuyten Duyvil Creek. These Indians were a sub-tribe of the Wappingers or Wapanachki called the Reckgawawancs." [1] This name seems to have been given to the Indians who inhabited Manhattan Island, while the term Manhattans as already stated was a classification of dialect only. Ruttenber says that the Reckgawawancs were named after their chief Rechgawac; [2] and the name also seems to have been applied to part of the island for Riker says that,— "The Indians still [in 1669] laid claim to portions of the Harlem lands,....one of the tracts being their old and favorite haunt Rechewanis, or Montagne's Point. The chief claimant was Rechewack, the old Sachem and proprietor of Wickquaskeek, who, as far back as 1639, had been a party to the sale of Ranachqua and Kaxkeek." [3]

Not much is known of their habits and customs beyond what has been inferred from the relics to be seen in this exhibit, but Mr. Bolton writes:

"We are not without detailed description of our primeval predecessors upon the island of Manhattan, for the Hollanders recorded many of their impressions of aboriginal peculiarities. We may assume that they possessed the usual characteristics, the stolid demeanor, the crafty methods, and revengeful nature of the Indian, all of which were exhibited in their dealings with the White intruders. These local bands appear to have had, in addition, some particular local habits. They painted their faces with red, blue, and yellow pigments, to such a distortion of their features, that, as one sententious Dominie expressed it, 'They look like the devil himself.' Their dependence on supplies of game and fish caused their removal from one place to another, semi-annually, and we read of their removal to a summer 'hunting-ground' in Westchester, whence the band returned to 'Wickers Creek,' for the winter shelter, and to resume their occupation of oystering and fishing in the Harlem and Spuyten Duyvil Creek.

"As for dress, 'They go,' said Juet, 'in deerskins, loose well-dressed, some in mantles of feathers, and some in skins of divers sorts of good furres. They had red copper tobacco pipes, and other things of copper they doe weare about their neckes.'

"No copper objects have been found in upper Manhattan, probably their metallic stock was bartered away with the early colonists, for in 1625, De Laet described their use of 'Stone pipes for smoking tobacco.'

"As regards their food, the evident abundance and size of the local oyster shells shows that they possessed in them a ready source of subsistence. As soon as Hudson's ship reached the neighborhood of Greenwich, where the

[1] Ibid., p. 46.
[2] Ruttenber, op. cit., p. 78.
[3] History of Harlem, p. 287.

Indian Village Sappokanikan was located, the natives 'brought great store of very good oysters aboard, which we bought for trifles.' De Laet (1625) says, 'their food is maize, crushed fine and baked in cakes, with fish, birds and wild game.' Van der Donck and others wrote in 1649:

> Their fare, or food, is poor and gross, for they drink water, having no other beverage; they eat the flesh of all sorts of game that the country supplies, even badgers, dogs, eagles and similar trash, which Christians in no way regard; these they cook and use uncleansed and undressed.
>
> Moreover, all sorts of fish; likewise, snakes, frogs and such like, which they usually cook with the offals and entrails.
>
> They know also, how to preserve fish and meete for the winter, in order then to cook them with Indian meal.
>
> They make their bread, but of very indifferent quality, of maize, which they also cook whole, or broken in wooden mortars.
>
> The women likewise perform this labor, and make a apa or porridge called by some, Sapsis, by other, Duundare, which is their daily food, they mix this also thoroughly with little beans, of different colors, raised by themselves; this is esteemed by them rather as a dainty than as a daily dish.

"Their weapons were, of course, the usual aboriginal bow, arrow, spear, club and tomahawk, though but a few years later, they had acquired from the settlers enough fire-arms to become exceedingly expert in their use. 'Now, those residing near, or trading considerably with the Christians, make use of fire-locks and hatchets, which they obtain in barter. They are excessively fond of guns; spare no expense on them, and are so expert with them, that in this respect they excell many Christians.' Many of their discarded neolithic weapons have been found, and these exhibit a wide variety of material and workmanship, indicating considerable acquisitions from other tribes and localities. Their household utensils included 'mats and wooden dishes,' and Juet refers to their 'pots of earth to dresse their meats in,' and speaks also of the women bringing 'hempe.' The character of the grass mats which the women wove is to be seen in the imprints made with such material upon the outer surface of some of the local pottery. They also made the grass baskets, often referred to in early records, as 'napsas.' The pots of earth were the large earthenware vessels made by the Indian women, on the decorations of the rims and upper portions of which these poor creatures expended all their ingenuity and sense of art.

"Of these objects, there remain a number of interesting examples discovered in upper Manhattan, the most complete, and at the same time, most artistic, being the fine Iroquoian vessel discovered by Mr. W. L. Calver, on the south side of 214th Street, about 100 feet east of 10th Avenue, in the fall of 1906. The large vases found in broken condition in the cave at Cold Spring, are of the cruder and therefore, earlier design of the original

Algonkian inhabitants, who at a later period, probably by barter, and perhaps by inter-marriage, acquired or learned the art of Iroquoian design and decoration.

"Of the period during which the race occupied this locality, we can only make conjectures. The extent and character of the shell heaps at Cold Spring and the pits and burials at Seaman Avenue, certainly indicate a settlement of large numbers or of considerable age. The ceremonial pits at 212th Street and certain remains of aboriginal feasting, such as fish bones and oyster shells, appeared to exist at a level below the graves of the slaves of the settlers, buried at that place.

"While these conjectures may carry back the period of occupancy to antiquity, the tools and weapons are all of the modern order, and no objects of true paleolithic character have been discovered, so that we have as yet nothing definitely reaching back into the remote ages of the most primitive mankind, although on Hunt's Point in the Bronx, at no great distance away from our island, a very interesting rude ax and a hammer were discovered by Mr. Calver in a gravel-pit, near the old Hunt burying-ground."

Location of Archæological Remains on Manhattan Island.[1]

The first field work done on Manhattan Island is of very recent date. Doubtless many articles of Indian manufacture and evidences of Indian occupation were found as the city grew up from its first settlement at Fort Amsterdam, but of these specimens we have very few records. The first specimens found which have been preserved, to the knowledge of those now interested in the subject, were found in 1855, and consisted of a deposit of Indian arrow-points found in Harlem during excavation for a cellar on Avenue A, between 120th and 121st Streets. Some of these are spoken of by James Riker [2] as being in the author's cabinet. Riker also speaks of shell heaps near here.[3] The next specimens preserved were found at Kingsbridge Road (now Broadway) and 220th Street in 1886, and are in the John Neafie collection at the Museum. These consist of an arrow point and a few bits of pottery. The next work was begun in 1889 by Mr. W. L. Calver of this city, and has led to the discovery of much valuable material which has been preserved.[4]

[1] By James K. Finch.

[2] History of Harlem (1881), footnote, p. 137.

[3] Ibid., p. 366.

[4] In the Spring of 1890 Mr. Edward Hagaman Hall began his investigations and at about the same time Mr. Reginald P. Bolton entered the field of local research. In many instances these gentlemen and Mr. Calver collaborated with valuable results. In the preservation of the traces of Indian occupation of Manhattan Island the American Scenic and Historic Preservation Society (formed in 1895 under the presidency of the late Hon. Andrew H. Green, but now under that of Dr. George Frederick Kunz) has done much pioneer work. Editor.

The following account of the work is taken mainly from Mr. Calver's note-book:

In the autumn of the year 1889, while exploring the heights of Bloomingdale (now called Cathedral Heights) for any relics that might have remained from the Battle of Harlem, Mr. Calver discovered one arrow point at 118th Street, east of Ninth Avenue, and immediately afterwards a circular hammerstone. On a later trip to the same locality, he found a small grooved axe or tomahawk.[1] In February, 1890, while hunting for Revolutionary relics in the vicinity of Fort Washington, he made a trip to the northern part of the Island in search of British regimental buttons, many of which were said to have been found in that vicinity. There he met an old acquaintance, Mr. John Pearce, a policeman then on duty there, by whom he was introduced to Mr. James McGuey, a youth residing in the vicinity of 198th Street and Kingsbridge Road. To Mr. Calver, Mr. McGuey presented several relics found by himself on camp sites and made an appointment to meet him early in March to explore for Indian remains. The same day, Mr. Pearce took Mr. Calver to be introduced to Mr. Thomas Reefe who resided near Kingsbridge Road and Isham Avenue, and, while crossing the orchard at Academy Street and Seaman Avenue, Mr. Calver saw that the ground was thickly strewn with shells which afterwards proved to be of Indian origin.

The first Sunday in March, Messrs. Calver and McGuey explored this part of the Island for Indian remains. At the junction of Academy Street and Prescott Avenue, they found an Indian potsherd whose importance Mr. McGuey seemed to realize, for, a week later, Mr. Calver met him again and was presented by him with a number of fragments of Indian ware. He assured Mr. Calver that he had found it by digging in an Indian graveyard. The two men dug again at this place, now known as "the Knoll," and found more pottery. They then went to Cold Spring, a point on the extreme northern end of the Island, and in a shell heap there they found more Indian work. Mr. Alexander C. Chenoweth, an engineer, then on the Croton Aqueduct, hearing of these discoveries, obtained a permit from the property owners and began to explore "the Knoll" for Indian remains. Having finished here, he went to Cold Spring and made some further discoveries. All his specimens were purchased in 1894 by the Museum, and some of them are now on exhibition.

Since this time, several interesting relics have been found and, as the work of grading streets and other excavation at this part of the Island are carried on, more relics will probably come to light. An account of the recent finds will be found in another part of this Guide, the time of this writing having been 1904.

[1] The writer found an arrowhead on South Field, in front of Columbia University Library, on September 30, 1904.

The only Indian remains left on the Island, so far as known to the writer, are situated at the extreme northern end at Inwood and Cold Spring. They consist of the co-called shell heaps or refuse piles from Indian camps, and three rock-shelters at Cold Spring. But we have evidence to show that this was not the only part of the Island occupied by the Indians. Mrs. Lamb [1] says that the Dutch found a large shell heap on the west shore of Fresh Water pond, a small pond, mostly swamp, which was bounded by the present Bowery, Elm, Canal and Pearl Streets, and which they named Kalch-Hook or shell-point. In course of time, this was abbreviated to Kalch or Collect and was applied to the pond itself.[2] This shell heap must have been the accumulation of quite a village, for Mrs. Jno. K. Van Rensellaer [3] speaks of a castle called Catiemuts overlooking a small pond near Canal Street, and says that the neighborhood was called Shell Point. Hemstreet refers to the same castle as being on a hill "close by the present Chatham Square," and says that it had once been an "Indian lookout." [4] Excavations at Pearl Street are said to have reached old shell banks. "The Memorial History of New York" [5] says that a hill near Chatham Square was called Warpoes, which meant literally a "small hill." [6] According to the same authority, "Corlear's Hoeck was called Naig-ia-nac, literally 'sand-lands.' It may, however, have been the name of the Indian village which stood there, and was in temporary occupation." This is the only reference we have to this village, but there are references to another on the lower end of the Island. Janvier [7] says that there was an Indian settlement as late as 1661 at Sappokanican near the present Gansevoort Market. According to Judge Benson,[8] Sapokanican was the Indian name for the point afterwards known as Greenwich. "In the Dutch records references are made to the Indian village of Sappokanican; and this name....was applied for more than a century to the region which came to be known as Greenwich in the later, English, times. The Indian village probably was near the site of the present Gansevoort Market; but the name seems to have been applied to the whole region lying between the North River and the stream called the Manetta Water or Bestavaar's Kill." [9] Benton says that the name of the

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[1] History of New York City, p. 36.

[2] Mr. Edward Hagaman Hall, however, derives the name from "Kolk" or "Kolch" a word still in use in Holland and applied to portions of a canal or inclosure of water. The word also means "pit hole", which aptly describes the Collect Pond.

EDITOR.

[3] Goede-Vrouw of Manahata, p. 39.

[4] Hemstreet, Nooks and Corners of Old New York, p. 46.

[5] Bulletin, N. Y. State Museum, Vol. 7, No. 32, p. 107, Feb., 1900.

[6] James G. Wilson, op. cit., p. 52.

[7] Evolution of New York.

[8] N. Y. Historical Society Collection, S. II, Vol. II, Pt. I, p. 84, 1848.

[9] Thos. A. Janvier, In Old New York, pp. 85–86.

village was Lapinican.[1] Going back to the old Dutch records might lead to finding the actual names and other data regarding these places.

Most of the specimens found on Manhattan Island, as already stated, come from the northern part. We have a few from the central portion, however. There are the arrow-heads spoken of by Riker, and in Webster Free Library there is a fine specimen of a grooved stone axe found at 77th Street and Avenue B. Mr. Calver has found an arrow-head at 81st Street and Hudson River and specimens from the site of Columbia College have been recorded.

Doubtless the northern part of the Island was inhabited for the longer period; but it is probable that all along the shore, wherever one of the many springs or small brooks, shown on old maps, emptied into the Hudson or East River, there were small, temporary Indian camps. It is likely that these camps were used only in summer, while the primitive occupant of Manhattan retreated to the more protected part of the Island, as at Inwood and Cold Spring, during the winter. Or it may be possible that, as Ruttenber[2] states, the villages on Manhattan Island were only occupied when the Indians were on hunting and fishing excursions, while their permanent villages were on the mainland. Bolton,[3] however, says their principal settlement was on Manhattan Island.

Fort Washington Point. There is a small deposit of shells, on the southern edge of the point, in which the writer found some small pieces of pottery and a few flint chips, thus proving its Indian origin. This was probably a summer camp, as it was too exposed for winter use.

The Knoll. "The Knoll" was the name applied to a small rise of land, at the southwest corner of Dyckman Street and Sherman Avenue, which ran out into Sherman Creek from the eastern edge of the hill at that place. As already stated, Messrs. Calver and McGuey found potsherds here; then Mr. Chenoweth obtained permission of the property owners to make excavations. He found numerous fragments of arrow points and pottery in some refuse deposits from an Indian camp and also uncovered what were thought to have been "paved fireplaces." The newspapers of the time had accounts of the finds, with pictures of the pottery and other objects found.[4] Mr. Chenoweth also uncovered a number of skeletons. It is stated that these graves were marked with rough headstones, and there are pieces of a coffin from here in the Terry collection in the American Museum, as are also a number of lead buttons found with one interment. Everything seems

[1] New York, p. 26.
[2] Indian Tribes of Hudson's River, p. 78.
[3] History of Westchester County, p. 25.
[4] New York Herald, January 14, 1894; also Illustrated American, September 19, 1901.

to point to these as being burials of early settlers, but Mr. Chenoweth holds that they are Indian. Several of the skeletons have been preserved in the Museum. A parallel condition to this at the Knoll was found at 211th Street and will be spoken of later. The Knoll site had undoubtedly been an ancient Indian camp. Probably Sherman Creek was open up to this point to Indian canoes.

Cold Spring. Cold Spring is situated at the extreme northern end of Manhattan Island on the southern shore of Spuyten Duyvil Creek. The Indian remains consist of three rock-shelters and three refuse heaps. The rock-shelter is a formation where the overhanging rocks form a small cave or shelter which the Indians used as a dwelling place. All their rubbish, such as oyster shells, broken pottery and broken arrow heads, were dumped near by, forming the so-called shell heaps. Messrs. Calver and McGuey explored the shell heaps; but Mr. Chenoweth was the first to suspect the existence of the shelters. There is only one which is likely to have been used as a dwelling place, the others being places where food was stored or shelters for fires used in cooking. These shelters face east, and are at the foot of the hill (formerly called Cock Hill) which forms the most northern part of Manhattan Island. The largest one was formed by several of the rocks breaking off the cliffs above and falling in such a manner that, by digging out some of the earth from beneath them, the Indians could make a small shelter. Probably it was occupied by one family, while the others lived in bark wigwams near by.[1] Another of the shelters is simply an excavation under the end of a huge fragment which also dropped from the cliffs above, and the third is a large crevice in the foot of these cliffs. When Mr. Chenoweth first explored them, all these shelters were completely filled with earth which had gradually worked its way in since their occupation, and much credit is due him for suspecting their presence. In them he found fragments of pottery and stone implements, together with the bones of turkey and deer. The largest of the refuse heaps is situated on a rise directly in front of these shelters. It consists of a layer of shells, in places several inches thick, found under a layer of fine loam, a black earth which has been deposited since the shells were scattered over the original sandy yellow soil. The sheltered position of this place made it an especially desirable camp site. The hills to the south and west formed a protection to the camp from winds, and by Spuyten Duyvil Creek access could be had to either Hudson or East River; while the Cold Spring, from which the place takes its name, furnished an abundant supply of fresh water.

[1] Memorial History of New York, Vol. I, p. 33, for picture of houses, and p. 39 for description.

Inwood Station Site. At the foot of Dyckman Street and Hudson River, there existed a large deposit of shells, most of which were removed when the rocks on which they lay were blasted away for grading the street. A few arrow points and bits of pottery, as well as several Revolutionary objects, were found here. Part of the deposit is still left on the northern shore of the small bay just below Inwood station. There are photographs of this deposit in the Museum.

Harlem Ship Canal. Formerly at 220th Street and Kingsbridge Road was a large deposit of shells on the westerly side of the road. This was destroyed when the ship canal was put through. As with the Inwood Station site, no systematic examination of this place was ever made. Mr. John Neafie found some potsherds here in 1886, and Mr. Chenoweth also has some potsherds from here.[1] Mr. Calver says that this was a large deposit, and that the peculiar thing about it was that the shells were so wedged and packed together that a pick would hardly penetrate them. They lay on the bare rock surface in cracks in the rock.

Harlem River Deposit. Mr. Calver says, "Extending from 209th Street to 211th Street on the west bank of the Harlem River and almost on a line with Ninth Avenue was another large deposit of oyster shells lying just beneath the top soil of the field. These shells had nearly all been disturbed by the plow and are interesting only for their color, which was red. Pieces of horn of deer and split bones of the same animal were common among the shells; but, in spite of the apparent antiquity of the deposit, there were, even in the lowest strata of it, some small fragments of glass which proved that either the whole mass had been disturbed or else the shells had been left during the historic period. There are several stone sinkers and hammerstones from this spot in Mr. Calver's collection and at the Museum.

Isham's Garden. This is a large garden about on the line of Isham Street and Seaman Avenue. The soil is white with small fragments of shells. A number of arrow points, flint chips, hammerstones, sinkers and a few bits of pottery have been found here. Mr. Calver has found several shell pockets with small deposits of pottery, etc., on the hill to the south of this garden.

Academy Street Garden. This is a small garden between Academy and Hawthorne Streets, running through from Seaman Avenue to Cooper Street. It was a British camp site during the Revolution, and a number of buttons, gun-flints and bullets have been found there as well as numerous Indian remains. It seems to have been the workshop for a red jasper-like stone of which numerous chips but no finished implements have been found. The shells at this point were first noticed by Mr. Calver in 1890. They may not all be of Indian origin, as some may be due to soldiers.

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[1] John Neafie collection, 20–2558; Chenoweth, 20–3498.

Dog Burials found in 1895. In January, 1895, Mr. Calver found two interesting "dog burials." The first burial was unearthed at the summit of a ridge of soft earth at 209th Street, near the Harlem River. The ridge, which was about twelve feet high, had been partly cut away for the grading of Ninth Avenue. It was at the highest part of the hillock that a pocket of oyster and clam shells was noticed, from which a few fragments of Indian pottery which lay on the face of the bank had evidently fallen. The shells, upon inspection, were found to have served as a covering for the skeleton of a dog or wolf. Another burial was found on May 18th within fifty yards of the first burial. It had been covered with shells just as the first one, but had been disturbed by workmen. Mr. Calver says: "The two canine burials were situated at a point just without the borders of the Harlem River shell heap and were distinct from it. The shells were found to be matched, hence it was concluded that they were thrown in unopened or eaten on the spot. As the skeletons were intact and the bones uninjured, all probability of the animals having been eaten is disposed of." These burials are common in this vicinity. No satisfactory explanation of them has been given; but Mr. Calver thinks they were for some religious purpose, and suggests a relation to the "White Dog Feast" of the Onondaga of this State.[1] It is certain that the pockets were in many cases used as fireplaces.

Shell Pockets at 211th Street. In March, 1903, there was considerable excitement over the reported discovery of an Indian graveyard at 211th Street.[2] The graveyard proved to have been that of some slaves, and was situated on the western end of the rise between 210th and 211 Streets, on the eastern end of which is the old Neagle Burying Ground. This discovery was interesting because under the negro graves several shell pockets of undoubted Indian origin came to light. The workmen, in grading Tenth Avenue, cut into this hill to obtain material for filling, and uncovered the graves and pockets. It seems almost certain that the deposits were made some time ago; then the wind blew the sand over the deposits to a depth of four or five feet, and negroes later used this place as a burial ground. In support of this theory is the fact that the pockets were four or five feet under the surface, that the soil above showed no signs of having been disturbed, and that this rise is put down on the Government maps of this section as a sand dune.[3] During the summer of 1904, Mr. Calver with Messrs. Hall and Bolton uncovered nine more pockets to the southwest of the graveyard.[4] These pockets all seem to have been of the same period as the others, and

[1] N. Y. Herald, May 26, 1895.
[2] Evening Telegram, March 14, 1903.
[3] New York Geologic Folio.
[4] New York Tribune, Oct. 30, 1904, and New York Sun, Dec. 14, 1904.

all appear to have been on the original ground surface, although those farther up the hill were some four feet under the present surface. In one of these pockets, was found the complete skeleton of a dog[1]; in another, a turtle shell; two others contained complete snake skeletons; while a fifth held the fragments of a small pottery vessel. The pockets were small, being about three feet in diameter and of equal depth, showing no signs of having first been used as fire places and then filled up, though charcoal was scattered among the shells. Almost all the relics from Van Cortlandt Park were found by Mr. James in pockets similar to these.

During Indian troubles in 1675, the Wickquaskeeks at Ann's Hook, now Pelham Neck were told "to remove within a fortnight to their usual winter quarters within Hellgate upon this island." Riker says, "This winter retreat was either the woodlands between Harlem Plains and Kingsbridge, at that date still claimed by these Indians as hunting grounds, or Rechawanes and adjoining lands on the Bay of Hellgate, as the words 'within Hellgate' would strictly mean, and which, by the immense shell-beds found there formerly, is proved to have been a favorite Indian resort." [2] A little later the Indians asked to be allowed to return to their maize lands on Manhattan Island and the Governor said that they, "if they desire it, be admitted with their wives and children, to plant upon this Island, but nowhere else, if they remove; and that it be upon the north point of the Island near Spuyten Duyvel." [3]

Mrs. Mary A. Bolton Post, in writing to the editor of "The Evening Post," June 19th of the year of the opening of the Harlem Ship Canal (1895), speaks of some Indians who were allowed to camp on the south side of Spuyten Duyvil Creek on the Bolton property in 1817. Ruttenber says that the Reckgawawanos had their principal village at Yonkers, but that on Berrien's Neck (Spuyten Duyvil Hill) was situated their castle or fort called Nipinichsen. This fort was protected by a strong stockade and commanded the romantic scenery of the Papirinimen, or Spuyten Duyvil Creek, and the Mahicanituk (Hudson River), the junction of which was called the Shorackappock. It was from this castle that the Indians came who attacked Hudson on his retu n down the river.[4] Some small shell deposits occur on Spuyten Duyvil Hill, but as yet this "castile" has not been definitely located. The village site at Yonkers, according to Mr. James, is now covered by buildings; but several relics found near the site years ago are now in the Manor Hall at that place (1904).

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[1] All that could be saved of this skeleton has been presented to the Museum by Mr. Edward Hagaman Hall.

[2] History of Harlem, p. 366.

[3] Ibid., p. 369.

[4] Ruttenber, pp. 77–78.

Judging from these references, we might conclude that the territory occupied by the tribe commonly known as Manhattans included Manhattan Island and that part of the mainland which is west of the Bronx River north to Yonkers, and that these Indians were a sub-tribe of the Wappinger division of the Mahican.

Indian Burials.

Indian Burials. Notwithstanding all the efforts of various collectors, the first Indian burials to be discovered on the Island were due to the activities of Messrs. Bolton and Calver in 1904. The improvement of Seaman Avenue, Upper Manhattan, at that time, uncovered many relics of the long extinct Indian inhabitants among which Mr. Bolton saw unmistakable signs of Indian graves. To quote from this gentleman: "It thus became evident that there were human interments in the vicinity, and in August, 1907, the first burial was discovered under a shell pit in Corbett's garden. The grading process had been extended only about eighteen inches below the sod, but had sufficed to destroy the jaw of the skeleton which extended upwards, as did also the foot bones. The bones lay in and upon a close mass of oyster shells, some of which were unopened, the skeleton reclined on its right side, facing west. The arms were flexed and crossed, the knees bent and the head thrown back. No traces of weapons were found, nor were there any other objects found, save a fragment of an animal bone.

"The location and position led to further exploration, which, early in 1908, led to still more interesting discoveries. Sunday, March 22nd, being the first day in the field for exploration for the season for 1908, W. L. Calver and the writer met at Seaman Avenue and Hawthorne Street, Manhattan, to discuss plans for further excavations on this Indian village site. The rains of the winter 1907–8 had washed the west bank where the layer of oyster shells and black dirt lay along the hill, and a patch of red burnt earth was observed, which on digging out, disclosed a fireplace, evidently of the period of the Revolution, having some large burnt stones, ashes, wood charcoal, brick, broken rum bottles, a wine glass nearly complete, a large open clasp-knife with bone handle, a hoop-iron pot-hook, various forged head nails and a curious folding corkscrew. Gold buttons of Revolutionary pattern and an officer's silver button of the Royal Mariners, together with pewter buttons of the 17th Regiment disclosed who had occupied the spot.

"At one part of this fireplace, we came upon a pocket of oyster shells, evidently Indian, about two feet deep, and on removing some of these, had the good fortune to uncover a human thigh-bone. We worked carefully

into the shells and under the pocket, gradually disclosing the complete remains of a full-grown man (Fig. 19) lying on its right side, feet to the north, head facing east, knees doubled up, the left arm extended down through the thighs. The feet had been within the area of the hole in which the Revolutionary fireplace had been made, and only one or two foot bones were found. At a later period other foot bones were found on the opposite side of the Revolutionary fireplace, evidently having been displaced in its construction. The right arm was flexed, and the hand was under the head, the latter was

FIG. 19. INDIAN BURIAL, MANHATTAN.

intact and every tooth was in place. Shells had been packed over the body, and some around it. We were much puzzled by a number of human bones, lying compactly together by the skeleton, in a position that would have been in its lap had it been upright.

"We removed the skull, covered the remains, and on Sunday, March 29th, renewed the work. We went carefully to work upon the cluster of mixed bones in front of the large skeleton, and soon found them to be rather compactly arranged in a rectangular form about 14 by 26 inches, the long bones parallel. The vertebræ abruptly ended parallel with the head of the larger skeleton, and after working some time, we found a skull placed below, beneath the pile of bones in a vertical position, facing north, the

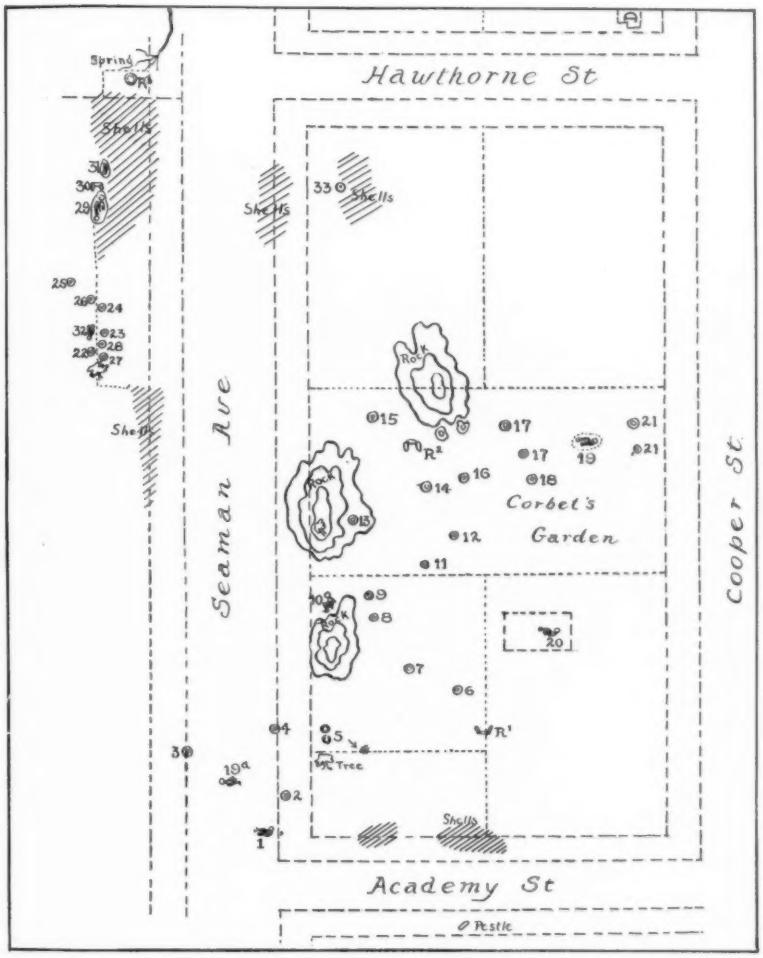

FIG. 20. LOCATION OF BURIALS, PITS AND SHELL-BEDS NEAR INWOOD.

1. Human remains. 2. Shell pit, deer antler. 3. Shell pit. 4. Shell pit, pottery. 5. Shell pits. 6. Shell pit, sturgeon below. 7. Shell pit, sturgeon scales. 8, 9. Shell pits. 10. Human remains. 11. Fire pit. 12. Shell pit. 13. Dog burial, puppy. 14. Shell pit. 15. Part of a jar. 16. Shell pit, fish and meat bones. 17. Shell pits. 18. Two dogs in shell pit. 19. Human skeleton, 1907. 19a. Female skeleton, 1908. 20. Human remains when house was built. 21. Small fire pits, Revolutionary. 22. Large shell pit. 23. Large shell pit. 24. Shell pit. 25. Dog burial. 26, 27, 28. Shell pits. 29. Two human skeletons, male and female. 30. Revolutionary fireplace "Royal Mariners" and "17th." 31. Skeleton and infant, female. 32. Skeleton (Chenoweth, 1908). 33. Revolutionary fireplace, 71st, officers' buttons. D. Dyckman dwelling. R^1, R^2. Revolutionary fireplaces. R^3. Revolutionary well.

lower jaw of which was disengaged, and was placed sideways in front of the face. The back of the skull was broken in, and was black with marks of burning. The lower jaw was burned, and some of the teeth split by fire. The arm and leg bones were charred at the joints. Inside the skull was a burned toe bone. Some oyster shells were among the charred remains.

"A significant fact was that the right arm bones of the large skeleton were below the pile of burned bones. This feature, and the compact arrangement of the latter within the space in front of and at the same level as the large skeleton, seem to point strongly towards an intentional arrangement of these bones, in front of the large corpse and to indicate the simultaneous burial of the two bodies. On examination, the large skeleton proved to be that of an adult male, and the dismembered remains those of a female of about 35 years of age. No implements were found with the remains, but a part of a stone pestle and a rude celt lay under the sod among the oysters above the large skeleton.

"On Sunday, June 14, 1908, another burial was found about 20 feet north of the above. This burial consisted of an adult skeleton doubled up and its back much curved, and was apparently that of a female of mature age. Between the knees, the remains of a small infant were laid, the skull of the latter being fragmentary. The right hand of the adult was below the infant and the left hand around the throat. The skull was intact and had nearly all the teeth. One finger bone had grown together at the joint in a crooked position apparently due to disease. On lifting the ribs of the right side, an arrow-head of flint fell out between the fourth and fifth bones. These skeletons lay about two and a half feet below the grass, and a pocket of oyster shells was over the head. The woman's remains lay within a space about 31 inches long by 50 inches wide, flat in the hard red sand bed facing east.

"Shortly after these remains were discovered, Mr. Chenoweth extended the excavation previously made by the explorers at the side of a large oyster shell pit in the same bank of sand, and uncovered a male skeleton of which he preserved the skull. Some small fragments of the skeleton were afterwards found by the writer on this spot. Contractors for the sewer in Seaman Avenue also uncovered the remains of a young female close to the position of several of the shell pits previously described.

"These interments have some curious features. The position of the remains facing east, sometimes west, the absence of weapons or other objects and the oyster shells packed with or above them are subjects for interesting discussion on which future finds may throw much light, as also upon the peculiar double burial and the burnt state of the female remains."

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